Chemical Industries Week

February 17, 1951

Price 35 Cents

High sales, high profits, continued rapid growth made 1950 a banner chemical year . . . . . p. 11

U.S. Rubber Co.'s McGavack studies natural rubber; seeks higher yield per tree . . . . . p. 18

New column plate design ups distillation efficiency . . . . . p. 22

Novel boiler compound, piloted in West, moves into eastern market; base: cedar shavings . . . . p. 28

CIW Camera: ICI builds Britain's largest ($75 million) chemical project . . . . . p. 41

A McGRAW-HILL PUBLICATION

Mrs. Smith IS A CAUSTIC SODA CONSUMER

That's right. Multiplied by the millions, Mrs. Smith is a *big* consumer of household products that use huge quantities of caustic soda. Soaps, cleansers, rayons, cotton and linen goods, paper products – her annual appetite for these almost numberless commodities is enormous indeed.

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Chemical Industries Week

February 17, 1951
Volume 68 Number 5

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Chemical Industries Week (including Chemical Specialties) is published weekly by McGraw-Hill Publishing Company, Inc., James H. McGraw (1860-1948), Founder. Publication Office: 1309 Noble St., Philadelphia 23, Pa.

Executive, Editorial and Advertising Offices: McGraw-Hill Building, 330 W. 42nd St., New York 18, N.Y. Curtis W. McGraw, President; Willard Chevalier, Executive Vice-President; Joseph A. Gerardi, Vice-President and Treasurer; John J. Cooke, Secretary; Paul Montgomery, Senior Vice-President, Publications Division; Ralph B. Smith, Editorial Director; Nelson Bond, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Vice-President and Director of Circulation.

Subscriptions to Chemical Industries Week are solicited in the chemical and process industries only from management men responsible for corporate affairs, purchasing, sales, marketing, packaging, research or chemical functions. Position and company connection must be indicated on subscription order. Address all communications to J. E. Blackburn, Jr., Director of Circulation, 330 W. 42nd St., New York 18, N.Y. Allow ten days for change of address.

Single copies 35¢. Subscription rates — United States and Possessions $5.00 a year; $8.00 for two years; $10.00 for three years. Canada $6.00 a year; $10.00 for two years; $12.00 for three years. Pan American countries $7.00 a year; $11.00 for two years; $14.00 for three years. All other countries $20.00 a year; $30.00 for two years; $40.00 for three years. Entered as second class matter July 15, 1944, at the Post Office at Philadelphia 23, Pa., under the Act of March 3, 1879. Printed in U.S.A.

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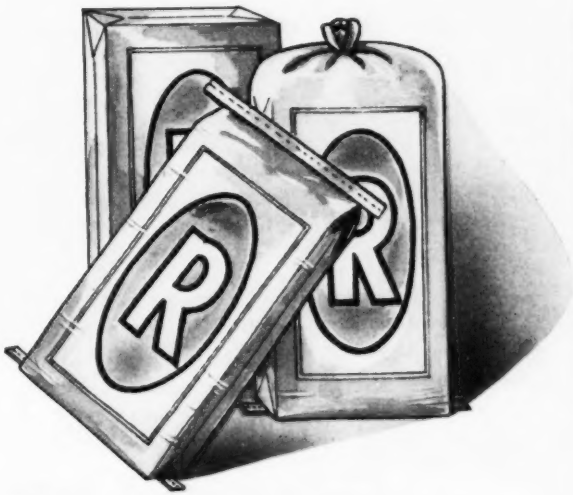

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Briefs

From recent literature

Brake fluids with improved characteristics can be prepared from 10% to 25% by volume of a lubricant, such as the mono- or diricinoleate of ethylene glycol, and 45% to 70% by volume of a proper diluent, such as ethylene glycol. Corrosion inhibitors and other ingredients may be added in small amounts when required.

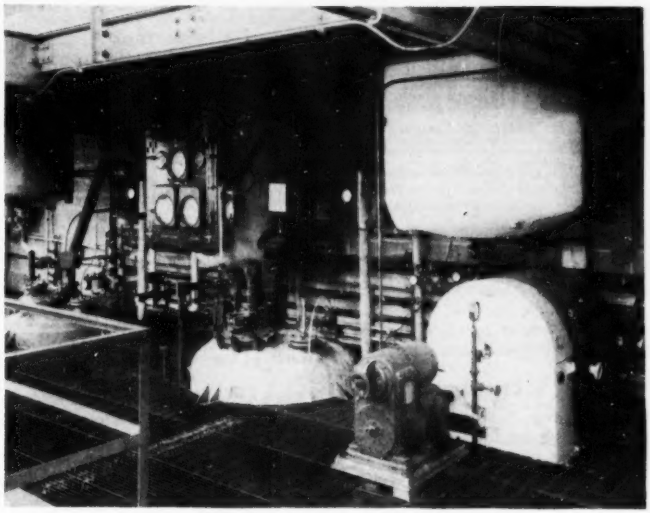
Flameproofing of certain papers is accomplished by using glycol monosulfates having a ratio of carbon to hydroxyl of between one and two. Such an agent can be prepared by reacting ethylene glycol (620 g.) with 1000 g. of concentrated sulfuric acid below 40° C. Neutralization can be carried out with an aqueous solution of a suitable base, such as ammonia or ethanolamine.

Epoxide compositions which convert to water-insoluble, infusible products can be prepared from one part by weight of a polyepoxide (prepared from the reaction of an epihalohydrin with a polyhydric alcohol, such as ethylene glycol, followed by dehydrohalogenation) with two-thirds to three parts by weight of a resinous epoxide (prepared by reaction of an epihalohydrin with a polyhydric phenol salt). Related products are obtained by the addition of small amounts of certain phenols to the epoxide mixture. Such epoxide compositions are valuable as organic bonding or cementing agents.

Antirusting compositions are conveniently prepared by reacting an anhydride of a dicarboxylic acid with a glycol, such as ethylene glycol, and with a monohydric alcohol. A further quantity of anhydride is finally condensed with this ester to produce the antirusting agent, which is particularly useful in turbine oils.

These developments are abstracted from recent publications or U. S. patents. The uses may suggest other applications of Jefferson Ethylene Glycol in your products or processes.

OPINION . . . . .



BENZOL PRODUCTS PLANT: Allethrin reactors.

Allethrin

To The Editor: Referring to your article on allethrin in the Jan. 27th number, the accomplishments of Benzol Products Company have not been given proper recognition.

Benzol Products Co. is an old established firm, prominent in the manufacture of bulk pharmaceuticals and intermediates. One of the reasons for its considering the production of allethrin was that it already manufactured certain necessary intermediates.

The process for large scale production of high purity allethrin was developed in Benzol's Piscataway laboratory by a team of chemists and chemical engineers, and a manufacturing plant was designed and built which is now operating successfully, producing allethrin on a regular tonnage basis.

Adolph Zimmerli
Consulting Chemical Engineer
New Brunswick, N. J.

CIW is happy to present Reader Zimmerli's remarks, feels it gave "proper recognition" to Benzol Products by being the first to report the company's manufacture of allethrin. Now publishes the first picture of any commercial allethrin plant (above).—Ed.

Karbate Pumps

To The Editor: We call your attention to the item entitled "'Karbate' Pumps" appearing on Page 37 of your January 20th issue.

This article starts with the words "Price of Karbate (resin-bonded impervious graphite) centrifugal pumps . . ."

The statement made in this article that "Karbate" impervious graphite is a resin-bonded impervious graphite, instead of impregnated graphite, is a misstatement with which we are continually battling. . . . . There are numerous resin-bonded materials on the market, and if "Karbate" impervious graphite is said to be a resin-bonded material it means that our products sold under this trade-mark are to be classified as identical with many resin-bonded materials. . . . . .

The last paragraph of this article states that the operating efficiency of "Karbate" impervious graphite pumps is not as high as that of metal pumps. While we do not doubt that this is true in some specific cases, still to the best of our knowledge, our operating curves are in some cases as good or better for pumps of similar construction.

We would not object too much about the efficiency curves or the statement on brittleness, despite the fact that "Karbate" imprevious graphite is not as brittle as high silicone iron which takes in a great deal of the chemical pump market, although this statement is also misleading.

But, we feel that too much liberty has been taken with the description of "Karbate" impervious graphite pumps with respect to the type of construction material, their efficiency and comparative brittleness and we would like to know if

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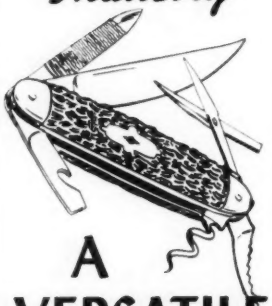

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you can arrange to correct the false impressions conveyed by this article.

C. G. OLLINGER
National Carbon Division
Union Carbide and Carbon Corp.
New York City

CIW pleads guilty to mixing up "resin-bonded" and "impregnated." However, far from condemning Karbate pumps, said "This (price reduction) greatly increases the potential scope of Karbate pump application . . . . . but doesn't add up to a push-over . . . . . its brittleness can be a limitation . . . . . operating efficiency is not as high as that of metal pumps." In regard to efficiency, we apparently over-generalized.—ED.

Bouquets & Brickbats

TO THE EDITOR: Now that you have had time to shake-down on the new publication, I want to write you to tell you how useful I find it—I believe I could safely use the word "enjoyable."

I particularly like the way in which the articles are abstracted, their brevity and the meat therein. I hope you will be able to keep it that way. . . . . .

LAWRENCE FLETT, Director
New Products Division
National Aniline Division
Allied Chemical & Dye Corp.
New York City

TO THE EDITOR: The first issue of *Chemical Industries Week* has been gone over quite thoroughly and the opinion I am about to express is a combination of the comments of some of my associates as well as my own.

This issue is very interesting, and if your organization is able to keep it on this high plane, I feel sure it will be successful. . . . . .

The style is easy to read and in interesting form. The publication is particularly good for the non-technical reader and I want to say that to me it fits in very well between "Business Week," which I have read regularly over the years, and the technical journals. . . . . .

E. C. THOMPSON, General Manager
Grasseli Chemicals Department
E. I. duPont de Nemours & Co.
Wilmington, Delaware

TO THE EDITOR: I shut the latest issue of CIW due to several relics of conventional practices, but became curious about that.

From pages like 8, 9, 10, 22 I estimate about 20 seconds to roughly discover the topic of each article (about 1 hour 20 minutes to truly search the edition for topics only.)

To get anywhere, further search and combat with freak language about "cashing chips" and "captive" chemicals would be needed.

Value undoubtedly is present in the publication. It is accessible far more than in many publications . . . . . But consider the reader's problem on seeing "For Rent" page 35—1,000 possible meanings and 1/50 chance of personal interest. Should he skip or gamble nearly a minute to find the topic of a column? Such a habit is scant pay. I shall never know what it is about.

We need what you are trying to give us. I hope you will succeed regardless of current styles to the contrary.

WALTER C. DURFEE
Boston, Mass.

Cracker Catalysts

TO THE EDITOR: We have read your article on "cracker" catalysts in the January 27th issue.

Inadvertently, no doubt, you neglected to mention The Davison Chemical Corporation's important position in this field . . .

Davison was first in 1942 to commercially produce a synthetic fluid cracking catalyst and is today, we believe, the largest producer of these catalysts. Our yearly output is approximately equal to that which the article credited to the industry as a whole, and our present plan calls for even further expansion.

Our capacity for the production of catalysts at the Cincinnati plant will be substantially improved this year through the completion of new facilities for the manufacture of the microspheroidal type of synthetic fluid catalysts by the spray-drying process.

Because we know that CHEMICAL INDUSTRIES WEEK endeavors to give complete information, we felt sure that you would wish to have this omission called to your attention.

R. L. HOCKLEY
Vice President Davison Chemical Corp., Baltimore, Md.

CIW apologizes for an inadvertent omission, goggles at Reader Hockley's revelation of Davison's hitherto secret production capacity—crowding a robust 40,000 tons per year.—ED.

CIW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.
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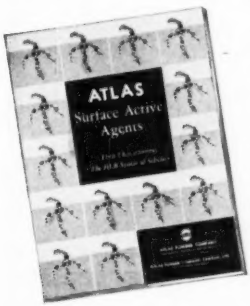

The up-to-the-minute data on the HLB System—the only one of its kind—is found in the new Atlas Surface Active Agents booklet. You'll find it a valuable tool—use your official stationery to write for your free copy today.

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Your Polyol Supply Can Be Steadied

With Atlas plans for doubled production of sorbitol rapidly going forward, large users of polyols are planning with Atlas for their requirements following the anticipated completion of new sorbitol facilities in late 1951. Future supply of raw materials for making sorbitol appears excellent, assuring sorbitol's steady availability at relatively stable prices, and further sorbitol plant expansion if needed to meet defense or civilian requirements.

Choosing Emulsifiers for Agricultural Chemicals

Atlas Research has just published a 24-page booklet explaining technique of choosing emulsifiers for insecticides and herbicides, methods of lab-testing concentrates, and 39 formulas for compounding over a dozen different toxicants. Ask for "Atlox Surface Active Agents for Agricultural Chemicals."

Sorbitol Plasticizes Greaseproof Coatings

Sorbitol is insoluble in oils and fats—and that fact has brought it into the limelight as a plasticizer for high-grade glue and gelatin compositions used in greaseproofing paperboard containers for oil, grease, fats and various solvent-laden materials. Newly-developed coatings containing sorbitol may be spread or sprayed, and appear to retain flexibility at low temperatures.

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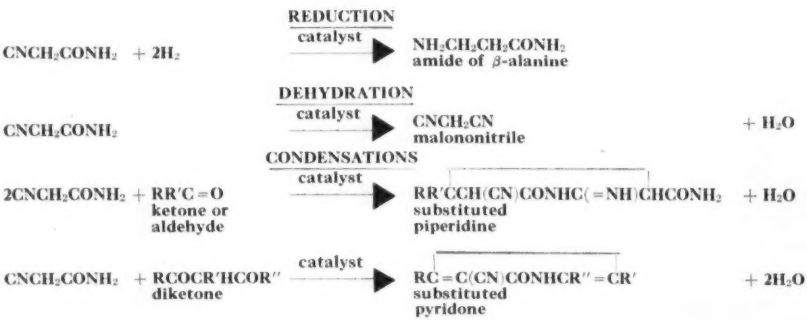
• Typical reactions of CYANOACETAMIDE •



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Chemical Industries Week

BUSINESS MAGAZINE OF THE CHEMICAL PROCESS INDUSTRIES

NEWSLETTER

More benzene from petroleum: Standard Oil Co. of Calif. will spend over $10 million to build a "Platforming" unit at its El Segundo, near Los Angeles, refinery. Completion is scheduled for the summer of 1952.

The unit will convert a light petroleum fraction by means of Universal Oil Products platinum-catalyst process. Annual product will consist of 13 million gallons of benzene and 48 million gallons of toluene.

And now there's petroleum ammonium sulfate. A new process developed by General Petroleum Corp. will use refinery sludge, waste sulfuric acid, and a nitrogenous component of by-product gas from cracking to make ammonium sulfate.

Solving a waste disposal problem at a profit, the new unit at General's Torrance, Calif., refinery is now turning out eleven tons of crystalline product a day, all of which is contracted for by the California Farm Bureau Federation.

Foote Mineral Co., Philadelphia, is pushing development work on a lithium hypochlorite household bleach, which may mark Foote's first venture into the consumer field. Although such lithium compounds are more expensive than currently used materials, convenience and long shelf life are sales factors. Other companies have been interested in the hypochlorite (CI, August 1947, p. 213), but none has pushed it to the commercial stage.

You can look for more activity soon in iso-octyl alcohol production. The common octyl alcohol used in plasticizers, etc., is 2-ethylhexanol, derived from ethyl alcohol; but the shortage and consequent high price of ethanol has upped the cost and shortened the availability of 2-ethylhexanol. Gulf Oil has just started making iso-octyl alcohol, but other companies are also studying the market, moving toward decisions to convert high-pressure equipment to its production.

NPA's natural rubber cutback has cut heavily into production of Pliofilm, used chiefly in food packaging. This is bad news for food packers since many alternate materials—aluminum foil, tin cans and polyethylene—are also tight.

Kaiser Magnesium Co., latest firm to bear the Kaiser name, has been formed as a wholly-owned subsidiary of Kaiser Aluminum & Chemical Co. to take over and operate the wartime magnesium plant, Permanente Metals Co., at Manteca, Calif.

Operating by the Pidgeon ferrosilicon process, the 10,000-tons-per-year plant will require expansion of the parent firm's dolomite plant at Natividad and ferrosilicon plant at Permanente.

You can expect to see more chemicals on Schedule "A" soon. Among scarce chemicals nominated for early control under NPA's chemical order, M-32, are nylon, polyethylene, sodium phosphate and hydrochloric acid.

Stauffer Chemical Co. will probably take the lion's share of benzene from Honolulu Gas Co.'s thermal petroleum cracking plant. Output, which will be about 1 million gallons a year, will be converted by Stauffer to benezene hexachloride at its Henderson, Nevada, plant.

Contract for Chemstrand Corp.'s synthetic fiber plant at Decatur, Ala., has just been let, and construction will get under way immediately. The multi-million-dollar plant will consist of manufacturing units, laboratories, general offices, a power house, and service facilities. Contractor is Daniel Construction Co. of Ala.

More aluminum from the Gulf Coast area: Reynolds Metals Co. will build an $80 million reduction plant near Corpus Christi, Texas, with a pig capacity of 75,000 tons a year. Construction will start in a few weeks and completion is expected before year's end. Natural gas will be used to generate 175,000 KW.

Alumina, raw material for the plant, will initially be shipped in from Reynolds' alumina plant at Hurricane Creek, Ark. Eventually an alumina plant will be built at the Corpus Christi site to utilize Reynolds' holdings of Jamaican bauxite. Mining facilities are now being installed in Jamaica by a subsidiary firm.

Kaiser Aluminum has reportedly okayed a site near New Orleans for a $70 million aluminum plant. This will also utilize ore from Jamaica deposits, where Kaiser is undertaking extensive mining operations.

Natural gas from Alberta may be forthcoming within the next few months. The provincial government of Alberta banned export of gas until further reserves were found, but American officials, acting on behalf of Defense Mobilization Director Charles E. Wilson, have told the Canadian federal government that the U.S. needs Alberta gas for continental defense.

Mathieson Chemical Corp. has brought two tracts of land in the Houston area. The larger, of 55 acres, is adjacent to the company's present fertilizer and sulfuric acid plant; the smaller is within Houston. No immediate use of the land is contemplated; it was bought to provide elbow room for future expansion.

Sizable market for vinyls opened up this month as Westinghouse started using vinyl gaskets—replacing natural rubber—on household refrigerator doors. Advantages claimed: they resist chemical attack, retain resilience longer.

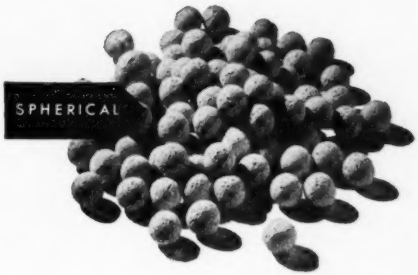
Guano is an unexpected atomic by-product: One of the recent atomic detonations in Nevada started an earth slide which opened up a second, unsuspected chamber in a cave where $500,000 worth of guano was found a couple of years ago. The newly bared chamber is larger and richer in guano than the first.

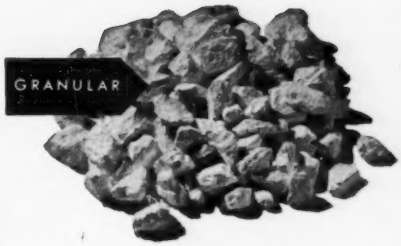
Another step to keep sulfur reserves within the Western Hemisphere has been taken by Mexico. No export permits will be issued until Mexican needs (about 11,500 tons a year) are satisfied, after which priority will be given to countries using sulfur in materials destined for Mexican industry.

Sulfur is also proving a headache here: The fertilizer industry is up in arms over diversion of sulfuric acid to other uses. One triple-superphosphate plant in Idaho has already shut down completely for lack of acid. NPA is giving "informal" assistance to users, but control is needed and may soon appear.

A rough check of NPA's Chemical Division shows that it is being staffed about two-thirds by industry people. A number of branch and section chiefs recruited by Division Director Bates had been in WPB's Chemical Division during World War II.

... The Editors





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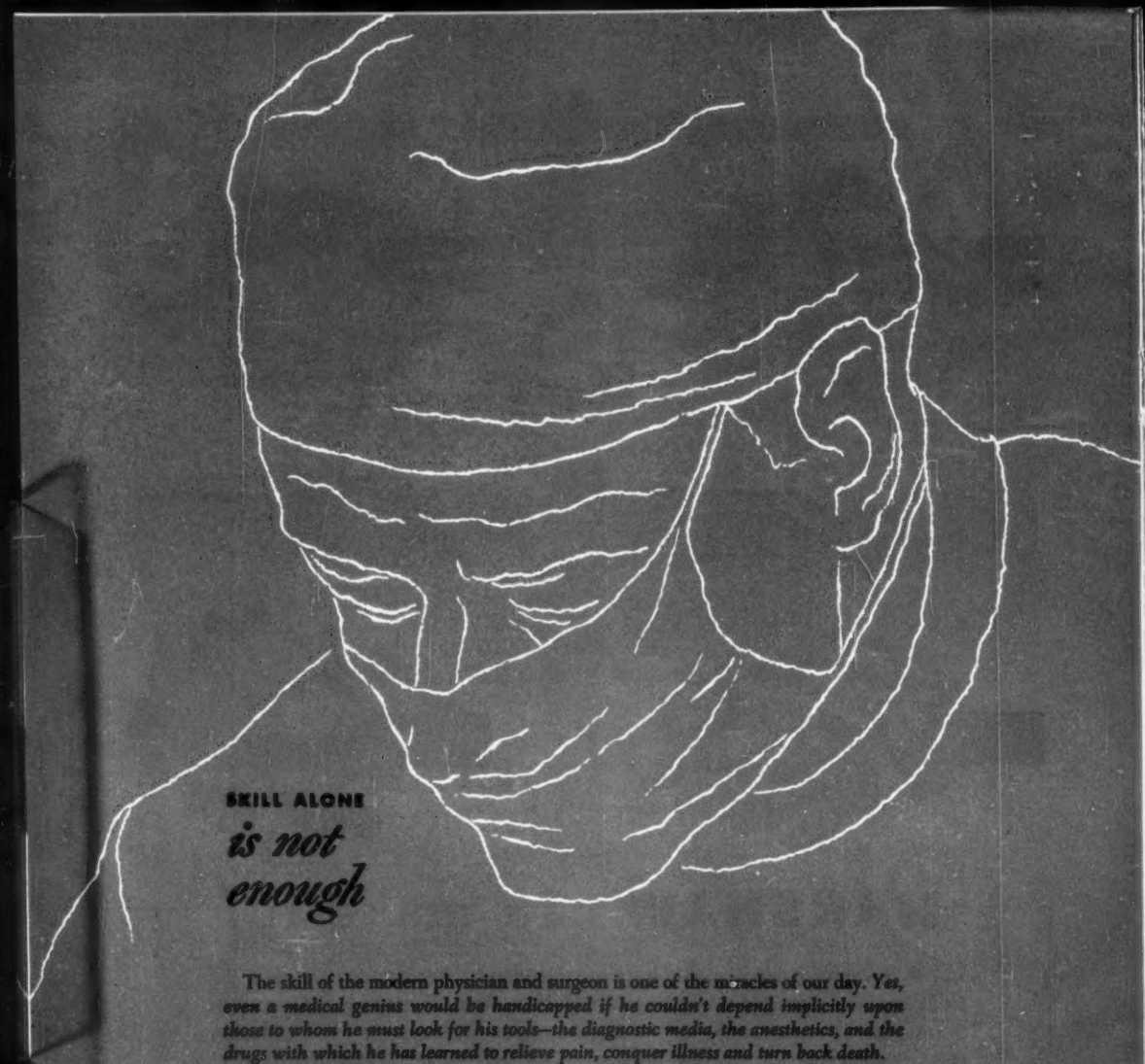

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WHAT'S NEW . . . . . .

Never Had it so Good

Chemical company profits reached a new high in 1950. Impending increases in excess profits taxes promise to make this record stand for some time to come.

Dollar sales last year were up 26% over 1949, 200% over 1940. Rearmament promises to send sales even higher this year.

To fulfill military demands, the near future will see huge increases in plant capacity imposed on recently-swollen production facilities.

As the accomplishments of last year commence slowly to unfold through the medium of the annual reports of the major companies, it becomes increasingly apparent that 1950 was "The Thing" for the chemical industry. Largely because of the chaos and uncertainties caused by the complicated and multi-faceted provisions of the excess profits tax law enacted late last year, 1950 reports (or estimates) are being delayed or diffidently announced. And for similar reasons 1950 earnings probably represent the peak for some time to come.

It is already evident that the year 1950 witnessed: (1) physical volume of output reaching new highs; (2) dollar sales soaring to record levels; (3) net income attaining new peaks, and; (4) dividend payments on common stocks reaching new highs. Eighty per cent of the companies included in this survey are on a calendar-year basis; the fiscal-year concerns range from a March 31st to a November 30th closing. These latter, without exception, would have had more favorable reports, had their operations been summarized for the twelve months ended December 31, 1950.

1950 vs. 1949: Few companies, outside of the fiscal-year concerns, have released annual reports or estimates regarding 1950 operations. Thus sales and net income figures are generally "informed guesstimates". The impact of excess profits taxes, retroactive to July 1, 1950, appears in the combined tabulations for net income *only* where officially reported or estimated—otherwise net is figured on the 42% rate of the Revenue Act of 1950, against the 38% rate for 1949.

On that basis: Sales of the 26 companies gained 21% over 1949; net income was 46% higher; and total dividend payments increased 51%, equal to approximately 63% of the estimated 1950 net income, versus 61% in 1949.

1950 vs. 1940: Comparison with 1940 dramatizes the magnitude of the growth of these 26 representative companies. It is even more remarkable when consideration is given to the fact that the chemical industry is so basic that it reaches into nearly every interstice of our economy. Accordingly, it could be argued that it should exhibit about the same rate of growth as the national average of industrial production.

Comparisons between the 1940, 1949 and 1950 rate of industrial and chemical production follow, with the percentage gains following the years 1940 and 1949 being the extent of the 1950 *gain* over those years.

Chemical Company Operations—1950, 1949, and 1940

(all figures in million of $)	Year	Par Value: Market Value of Equity	Par Value: Debt	Par Value: Preferred Stock	Sales	Net[1] Income	Common Dividends
Air Reduction	1940	$111.1	28.5	....	36.4	6.4	5.4
	1949	62.6	28.5	....	89.5	6.2	2.7
	1950	**56.1**	**28.5**	....	**103.0E**	**8.9**	**2.7**
Allied Chemical & Dye	1940	387.8	....	....	190.3	20.9	17.7
	1949	453.9	....	....	363.7	37.2	22.1
	1950	**522.5**	....	....	**408.0**	**41.2**	**26.6**
American Agri. Chem.[1]	1940	10.4	....	....	23.5	0.9	.75
	1949	27.8	....	....	46.5	4.2	2.8
	1950	**30.8**	....	....	**44.4**	**3.8**	**2.8**
American Cyanamid	1940	100.3	11.6	8.5	88.2	6.6	1.6
	1949	142.0	57.5	36.8	237.7	16.1	6.2
	1950	**341.2**	**53.8**	**54.5**	**320.0E**	**28.4**	**16.4**
Atlas Powder	1940	17.2	....	6.8	20.6	1.4	1.1
	1949	14.1	....	6.8	34.6	1.6	0.65
	1950	**21.1**	....	**6.8**	**41.0E**	**2.2**	**1.2**
Commercial Solvents	1940	29.0	....	....	15.8	2.4	.7
	1949	54.7	....	....	33.3	3.4	4.0
	1950	**81.9**	....	....	**45.0E**	**4.9**	**3.3**
Davison Chemical[1]	1940	3.8	.98	....	10.8	.135[d]	....
	1949	11.6	4.2	....	37.4	2.3	0.77
	1950	**19.9**	**4.6**	....	**35.0**	**2.2**	**0.6**
Dow Chemical[2]	1940	144.5	5.0	6.0	37.7	7.2	3.1
	1949	282.6	68.2	70.2	200.4	25.3	5.9
	1950	**484.6**	**62.6**	**46.4E**	**220.8**	**33.8**	**10.1**

(all figures in million of $)	Year	Par Value: Market Value of Equity	Par Value: Debt	Par Value: Preferred Stock	Sales	Net* Income	Common Dividends
Du Pont[3]	1940	1805.0	....	168.9	359.1	79.3	77.3
	1949	2762.9	....	268.9	1024.8	213.7	152.3
	1950	**3782.5**	....	**268.9**	**1200.0E**	**325.2**	**261.2**
Hercules Powder	1940	94.9	....	9.6	52.4	5.3	3.8
	1949	138.7	....	9.6	121.0	10.0	6.9
	1950	**176.2**	....	**9.6**	**165.5**	**14.5**	**8.8**
Heyden Chemical	1940	8.9	.4	.3	6.0	.77	.38
	1949	21.9	7.2	8.8	26.0	1.5	1.3
	1950	**20.6**	**6.4**	**8.1**	**27.5E**	**2.1**	**.8**
Hooker Electro-chemical[4]	1940	3.6	2.9	2.7	7.1	1.1	.175
	1949	26.5	1.8	10.0	21.8	2.6	0.97
	1950	**38.7**	**1.2**	**7.8**	**27.5**	**3.8**	**1.7**
Int'l Min. & Chem.	1940	22.8	4.5	10.0	12.3	.01	....
	1949	27.1	13.0	9.9	53.4	5.4	1.5
	1950	**55.8**	**12.9**	**9.8**	**58.4**	**5.8**	**1.7**
Mathieson Chemical	1940	22.8	....	2.4	12.4	1.6	1.2
	1949	63.4	20.0	2.4	54.1	7.0	2.6
	1950	**53.9**	**20.0**	**2.4**	**75.8**	**9.0**	**1.6**
Monsanto Chemical	1940	106.4	....	10.0	45.6	5.7	3.7
	1949	241.1	30.4	33.0	165.9	17.2	8.6
	1950	**363.4**	**30.4**	**27.5**	**230.0E**	**26.6**	**11.6**
National Cylinder Gas	1940	14.2	....	....	7.6	1.2	.9
	1949	14.0	4.8	4.5	23.0	1.9	1.1
	1950	**17.9**	**4.8**	**4.5**	**29.0E**	**2.6**	**1.1**[a]
Nopco Chemical	1940	5.5	1.5	....	8.3	0.7	.25
	1949	6.4	....	2.4	16.9	0.63	0.35
	1950	**9.4**	....	**2.3**	**19.5E**	**1.1**	**.7d**
Newport Industries	1940	5.0	1.0	....	4.7	.3	.19
	1949	8.2	1.9	3.8	13.6	0.4	....
	1950	**11.4**	**1.9**	**3.7**	**18.5E**	**1.5**	**.7**
Pennsylvania Salt	1940	27.0	....	....	12.5	2.8	1.3
	1949	34.2	5.5	4.3	33.2	2.7	1.4
	1950	**50.3**	**5.0**	....	**39.5E**	**4.4**	**2.0**
Pittsburgh Coke & Chem	1940	5.3	2.9	2.3	13.0	1.0	0.15
	1949	7.9	4.3	2.2	22.9	1.9	0.45
	1950	**11.1**	**5.1**	**2.2**	**36.0E**	**3.2**	**0.7**
Pfizer, Chas. & Co.	1940	NA	NA	NA	7.0	1.1	0.9
	1949	82.5	....	5.0	47.6	7.8	4.1
	1950	**125.1**	....	**4.9**	**59.5E**	**9.5**	**4.1**
Rohm & Haas	1940	NA	NA	NA	17.7	2.1	NA
	1949	53.2	2.2	6.2	62.4	5.1	0.77
	1950	**78.4**	....	**6.2**	**81.0E**	**7.3**	**1.2**
Union Carbide & Carbon	1940	636.2	29.1	....	231.4	42.2	23.7
	1949	1285.5	150.0	....	585.8	92.2	57.6
	1950	**1587.9**	**150.0**	....	**758.3**	**124.1**	**72.0**
U. S. Industrial Chem.[5]	1940	9.3	....	....	15.0	.8	....
	1949	11.7	7.3	....	50.8	2.4[d]	0.5
	1950	**18.6**	**6.9**	....	**40.5**	**.7**	....
Victor Chemical Works	1940	16.3	.75	....	8.5	1.0	0.97
	1949	35.1	0.2	9.6	29.4	2.9	1.5
	1950	**36.1**	**1.1**	**9.2**	**36.5E**	**3.7**	**1.7**
Virginia-Carolina Chem.[1]	1940	1.1	....	21.3	19.3	.6	....
	1949	3.6	5.5	21.3	58.7	4.1	....
	1950	**5.3**	**5.5**	**21.3**	**55.2**	**3.1**	....

(1) Fiscal year ended June 30
(2) Fiscal year ended May 31
(3) Sales and operating income do not include dividend income from General Motors holdings
(4) Fiscal year ended November 30
(5) Fiscal year ended March 31
* Includes provision for excess profits taxes only when reported
‡ Includes capital gains on sale of assets
(a) Plus stock dividends
(d) Deficit (E) Estimated

Federal Reserve Board Index of Production

(1935-39=100)	Industrial Production	1950 %Gain	Industrial Chemicals	1950 %Gain
1940	125	60%	153	200%
1949	176	13.6%	415	9.6%
1950	200		459	

In conjunction with this table, the following additional facts stand out: sales in 1950 were 232% higher than in 1940, net income increased 256% and dividends were up over 300%.

Airco: Among the companies examined Air Reduction was the only one whose common stock had a lower market valuation in 1950 than in 1940. Its market value dropped 50% despite a 180% rise in sales and a 39% increase in net income. But dividends dropped 50%.

Over this decade, management policy was changed from a high-margin, small-volume company (which paid out 75% or better of earnings in dividends), to one stressing lower prices (and a logical narrowing in profit margins), resulting in higher sales and increased profits. The higher retained profits were utilized to finance expansion. It is generally conceded that current prices are a more valid evaluation of earnings than those obtaining prior to World War II.

Another pertinent factor is the large relative gains in the fertilizer groups. These showed large percentage gains in both sales and net income in both 1949 and 1950 over their rather anemic pre-war record. With these increased earnings, dividends could also be upped.

Markets: In view of investor interest in the shares of chemical companies *(see p. 37)*, it seems germane to evaluate the dollar values that the public places on the combination of sales, earnings, and dividend policies of chemical companies. It is also a concern of management, in the event that either company policy or the balance sheet should dictate equity financing, since a given capital improvement could cost 15,000 shares—rather than 10,000 shares—depending on the stock market's valuation of the company's visible earning power and prospects.

At the close of 1950, the common stock vale of the 26 companies totalled $8,000,700,000—36% higher than at the end of 1949. Deleting the values for Rohm and Haas and for Pfizer, the combined value of the 24 companies of $7,954,000,000 at the end of 1950 was 124% higher than at the end of 1940.

Complete figures for 1950 *, as

* Comparative comments regarding the market values in 1940 and 1950 of the common shares of the chemical companies included in this consolidation are limited to 24 companies, as no dependable public market existed in 1940 for Rohm and Haas, or Chas. Pfizer & Co.

regards sales, operating income, net income, working capital, and net worth will not be available on the companies until later than usual, because of delays caused by excess profits tax computations. However, items of interest appear in comparing the 1950 value of the chemical equities, and these of 1940.

One dollar of the market value of the chemical stocks bought the following at the end of:

	1950	1940
Sales	$0.51	$.345
Net Income	0.085	0.054
Dividends	0.05	.04

Despite the retention of earnings (estimated at $250 million in 1950) and the raising of new capital—to further augment net worth—plus expanded sales and earnings, chemical equities sold at a lower price-to-earning ratio than at the end of 1949. Reluctance to evaluate more favorably the 1950 results and foreseeable expansion in 1951 sales and taxable earnings seems largely traceable to present and potential excess profits tax legislation, which was not a factor under consideration in the other years utilized in this study.

Excluding DuPont: At the end of 1950, the value of DuPont common stock equalled $4,218,200,000, or 53% of the 24 companies whose stock was publicly traded in 1940, and its 1940 value was 49% of the combined market value of these stocks in that year.

The DuPont situation is unusual. Although it is the largest factor in the chemical industry, the company's equity, market value, net income, and dividend payments are influenced greatly by the 20,000,000 shares held in General Motors. Dividend income from that investment was equal, respectively, to 43%, 37%, and 37% of 1940, 1949, and 1950 net income.

As the General Motors dividend does not influence sales, a better view of the industry is presented by the following table which eliminates DuPont (whose 1950 year-end equity valuation was nearly 6% greater than the total for the 24 companies at the end of 1940, including Du Pont, but excluding Rohm & Haas, and Pfizer).

	Market Value	*Sales*	*Net*	*Dividends*
	(all figures in millions of dollars)			
1950	4,218	2,934	363	174
1949	3,110	2,431	257	135
1940	1,761	897	114	68

* Excluding Rohm & Haas and Pfizer.

Last year: The year 1950 witnessed a firming in first-half sales, as filled-up supply lines that slowed 1949 sales were emptied by accelerated industrial activity. Changes in government price support programs on naval stores and the Korean crisis stepped up demand for all chemicals and resuscitated the antibiotic and industrial alcohol markets, boosting previously price-weak items The June-September alkali strike focused attention (and demand) on chlorine, soda ash and caustic soda. About the same time sulfur, benzene, styrene and mineral salts became headline items.

A combination of rising demand, wage boosts, and resultant price increases produced increased (dollar and volume) sales, a more even production rate, and higher operating profits. The improvement generated in the fiscal six months of 1950 carried the calendar-year companies into new highs for sales and earnings and endowed the 1950-51 fiscal-year companies with impressive beginnings—the fertilizer companies in particular.

This year: As for 1951 — there is danger in conjecture. The effect on earnings of World War II and postwar plant expansion became strongly evident by 1950 and would have reached fullest flowering this year under normal tax rates.

Superimposed upon this expanded plant will be further expansion, both government-inspired and company-planned. Largely, this expansion will qualify for certificates of necessity and the companies involved will eventually benefit from the additional plants.

To carry future postulations back to the present—or immediate future—two factors will exert an impressive impact upon net profits after taxes: the question of accelerated depreciation under certificates of necessity and the certainty of higher excess profits taxes.

Some companies within the chemical industry will be able to report moderately higher earnings this year (because of good base-year earnings and depressed 1949-50 prices of important products); an occasional few will qualify under the new products formula of the present excess profits tax law; and some will fall under the 62% tax ceiling. A 20% drop in earnings may prove applicable for the rest of the group.

As matters stand, dividends seem well protected despite excess profits taxes, and sales and earnings before taxes should burgeon. The average chemical share is expected to deviate from the general list only in showing greater resistance to decreased earnings.

PICTURES IN THIS ISSUE:

18, 19, 32—Lynn Crawford; 29—Ewing Galloway; 37—New York Stock Exchange; 38—Brookhaven National Laboratory.

Custom Poundage

Capitalizing on 18 years' experience in custom synthesis of small-lot, rare organic chemicals, R.S.A. Corp. (Ardsley, N.Y.) will broaden its base, custom-synthesize larger poundages of unusual pharmaceuticals. High on the production schedule at the moment are amino acids, but customers have half a dozen other compounds in mind that R.S.A. may make for them.

Business to R. S. Anthony, president of R.S.A. Corp. is much like sailing: keep a sharp eye on the barometer, heed the prevailing winds, and the boat will course along.

BOB ANTHONY: Sets a course to pharmaceuticals.

As a sailor, Bob Anthony is no novice*; as a businessman-chemist, he has tillered his firm (named after his initials) successfully as a pioneer in the custom synthesis of rare chemicals.

This week, with his own business barometer crowding a new $400,000 a year high, Anthony is heeding a new groundswell—the tendency of industry to defer "pure research," stress practical work which can be rushed to early completion. That means, perforce, a lessening demand for some of the unique, rare organics which R.S.A. has custom-synthesized in gram and kilogram lots; a surging demand, however, for dozens of unusual, difficult-to-synthesize chemicals needed in rather substantial poundage for "immediate" use.

Now, pharmaceuticals: New equipment, now being installed, will put R.S.A. smack in the middle of the pharmaceutical manufacturing business. It won't mean a forsaking of custom synthesis; on the contrary, it will mean a base-broadening of the

* Last year, off Montauk point, he hauled in a 696-lb. tuna, one of the three largest of the season.

CELANESE ANNOUNCES

PRODUCTION OF

1,3 BUTYLENE GLYCOL

- **Available in commercial quantities**
- **High boiling solvent and coupling agent**
- **Low toxicity**
- **Good humectant**

Celanese* 1,3 Butylene Glycol, a high boiling solvent and coupling agent, is interesting as a humectant, solvent, and lubricant in the textile, paper, ink and hydraulic fluid fields. Its low toxicity and hygroscopicity suggests its application in the tobacco, cosmetic and pharmaceutical industries. It is a versatile intermediate for surface active agents, rosin esters and allows production of polyester plasticizers with high dielectric constants for use in electrical insulation compounding.

PROPERTIES

Molecular weight	90.12
Form	Sweet viscous liquid
Boiling pt. (760 mm) °C	204
Flash pt. °F	250
Sp. Gr. 20/20	1.0045
Refractive Index 20°C	1.4368
Freezing Point °C	Below —50
Viscosity in cps at 35°C	89
Vapor Pressure 20°C in mm Hg	0.06
Solubility in water	Complete
Hygroscopicity — % water pick up at 80°C, 100% R.H. in 144 hrs.	66
Lbs. per gallon	8.4

Investigate Butylene Glycols by writing for Celanese Bulletins. Celanese Corporation of America, Chemical Division, Dept. 502-B, 180 Madison Avenue, New York 16.

2,3 BUTYLENE GLYCOL

Drum quantities of 2,3 Butylene Glycol of high purity are now available. The adjacent hydroxyl groups of this glycol make it interesting as a chemical intermediate for cosmetics, pharmaceuticals, resins, elastomers, and chemical specialties.

Celanese* CHEMICALS

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ACIDS · ALCOHOLS · ALDEHYDES · GLYCOLS · KETONES · PLASTICIZERS · SOLVENTS

company's custom synthesis operations.

As far as corporations go, R.S.A. is small and young. But its gravitation toward the manufacture of pharmaceuticals is hardly unnatural. Nor is it unusual that Anthony is now preparing to capitalize on extraordinary business conditions. He did just that in founding his enterprise 18 years ago.

When business activity dips, pure research—in some corporations at least—gets primary attention. That was the way it was in 1932 when Bob Anthony, employed as a control chemist by F. G. Shattuck Co. (Schrafft's candy) began the synthesis of chemicals in his home laboratory. (He says, thoughtfully, "I was one of those youngsters who drive Eimer and Amend to distraction—a dime's worth of this, a quarter's worth of that.")

Better than candy: Within three months after he began his extra-curricular activities, he found that research labs were paying him more for his high-purity compounds than he earned as a candy chemist. The next step: a $15 a month loft in Brooklyn to make thioglycolic acid ("I stunk up the neighborhood") and acetonitrile. The latter chemical was in particularly heavy demand at that time as a base for then-new Vitamin B_1.

After moving three times to larger quarters, R.S.A. was well on its way in 1942. Then, while Anthony was serving in the Chemical Warfare Service, his laboratory burned to the ground. Four months after this nearly catastrophic blow, and bolstered by financial assistance from his customers, Anthony opened his new unit in what had been a two-story garage in Ardsley.

Makes samples: Although R. S. A. has synthesized some 2,000-8,000 organics during its existence,* its bread-and-butter business has been the rare cholines — e. g. carbautyl choline chloride, β-methyl choline. Its sales problems have been few; 95% of its business is with dealers and jobbers (who enjoy a 5% discount on the 136 "standard" rare compounds that R. S. A. stocks, a 20% discount on "more rare" items. Another substantial share of R. S. A.'s business: major chemical companies who offer samples of new chemicals for investigation, often find that sample requests run up to an unexpected several hundred pounds, call on R. S. A. to make such quantities for sampling activities.

Currently, the average price of the multifarious R. S. A. organics is of the order of $10 a pound. But Anthony visualizes a drop in this average to $3—$5 as his company puts more emphasis on the larger poundage items. He'll be making less of the expensive ones, more of the more common pharmaceuticals.

Equipment-wise, R. S. A. is geared up to pharmaceutical needs. All kettles and condensers are glass, all centrifuges Heresite-coated, all packing, Teflon.

A 500 gal. Pafaudler kettle is now operating full tilt, turning out amino acids. And two more kettles are being installed—one of 200 gal. capacity, another of 300 gal.

And Anthony is confident that specialization can pay off for him and for his prospective customers. He cites one example: a prominent drug manufacturer asked him to quote on a 1000-lb. lot of a new chemical. He called to see their research men and purchasing agents, with a $4.50-per-pound price in his pocket. The purchasing agent opened the conversation with a flat statement . . . "we can't pay more than $5.50 a pound," got set to haggle on the price. His surprise at the $4.50 quote was a thing of beauty to Anthony . . . confirmed his suspicion that 18 years of specialization in organic synthesis could give him a profitable edge on the non-specialists.

* Most expensive: neostigmine methyl sulfate.

Paper Merger

The mystery of just how Abitibi Power and Paper Co. Ltd. and Alaska Pine group headed by the Koerner interests were going to "integrate" their operations following acquisition of B.C. Pulp and Paper Co. by Abitibi, (*CIW, Feb. 3, 1951*) has been solved. It turns out that Abitibi and Alaska Pine, powerful timber and sawmilling interests in British Columbia, plan a merger.

The deal has at last been explained by D. W. Ambridge, president of Abitibi, who says acquisition of the B.C. Pulp and Paper common stock by his company is the first in a series of steps intended to result in the merging of B.C. Pulp and Paper with Alaska Pine into a group which will ultimately be owned 50-50 by Abitibi and the Koerner interests and be known as Alaska Pine and Cellulose Co. Ltd.

The taking of the first step by Abitibi was designed to facilitate the working out of the transaction and the acquisition of B. C. Pulp & Paper shares.

By subsequent steps it is proposed that B.C. Pulp will acquire from the Koerner interests all the Alaska Pine group of companies, receiving money for that purpose (as well as to pay its existing bonds and preferred stock) by the issue of its bonds secured on its property and those of the Alaska Pine Companies.

Engineering appraisal and accounting studies are now under way for this purpose. It is expected B.C. Pulp will do its financing privately.

Abitibi will sell to the Koerner interests 50% of the common stock in B.C. Pulp and will finance the cost of its 50% of B.C. Pulp from its own resources and possibly from the proceeds of further financing.

After the merger, Alaska Pine & Cellulose Ltd., management will be carried out jointly by a board of directors, on which Abitibi and Koerner interests will be equally represented. Mr. Ambridge, president and general manager of Abitibi, will be chairman of the board.

Crop Food Curb

A strict federal fertilizer control law is being proposed. A bill now in the House Committee on Agriculture would regulate the registration, manufacture, labeling and inspection of fertilizer and fertilizer materials shipped in interstate commerce. It calls for annual registry of all types of fertilizers and 10-cents-per-ton inspection fee.

The proposed law requires that in addition to the usual brand name, name and address of manufacturer, and weight, the label on the bag or container also must carry details of the guaranteed analysis giving (1) minimum percentage of available nitrogen, (2) maximum percentage of water-soluble nitrogen, (3) minimum percentages of organic nitrogen and available phosphoric acid, (4) minimum percentage of potash and (5) maximum percentage of chlorine.

Under the proposed law nothing could be added to artificially change color or odor, and fillers such as cinders would be forbidden. A separate tag would be used to note that the fertilizer contains ground leather, hoofs, horns, wool waste, or feathers.

Water soluble nitrogen would be limited to 50 percent and anhydrous borax to 0.5%. It would have to be free of any ammonium sulphocyanide (thiocyanate).

A federal inspection service would be set up by the Secretary of Agriculture. On basis of analysis of samples, licenses would be issued. An annual fee of $10 for each brand or analysis would be charged. The fertilizer so "registered" would have inspection tags issued, at the rate of

10 cents per ton. A multitude of inspectors would have power to check material anywhere in transit.

A shortage of 5 percent of either nitrogen, phosphoric acid or potash below guaranty appearing on the bag, or shortage "in commercial value of 5 percent" below the guaranty would result in a $500 fine. If not paid, registration would be cancelled, the sale and shipment forbidden.

Plasma Arena

Spurred by the grim possibility of large-scale atomic warfare, a new type of American commodity—synthetic blood plasma—made its formal commercial debut last week. First to blow the horn was the General Aniline and Film Corp. with PVP (polyvinyl pyrrolidone), (CIW, Jan. 2, 1951), but hot in pursuit came Commercial Solvents tooting for dextran (bacterial polysaccharide).

There is really nothing new about either of these products. PVP had quite a play in Germany during World War II; dextran in Sweden and England. But they are new to this country, and rather sensational in view of their designation as blood plasma substitutes. In reality they are no such thing. Nothing yet produced by man—scientist or otherwise—can substitute for human plasma. The numerous and highly complex constituents (proteins, etc.) of human plasma cannot be synthesized, and no man-made material can do their job.

Misnomer: This does not mean that dextran and PVP are frauds. Far from it. Despite the misnomer, they are of very real value in treating victims of blood loss. All indications show that they do this job as well as the more conventional plasma. The confusion can be clarified by calling these materials, "blood volume extenders."

When a person has bled to any extent, blood pressure nosedives and he is in immediate danger of going into shock, often fatal. If this lost fluid can be replaced, blood pressure and chances of survival increase appreciably. Problem is to replace the lost volume with a fluid that will not do any damage to the circulatory system. In addition, the fluid must contain a high-molecular-weight material to prevent it from leaking out of the circulatory plumbing. PVP and dextran are such materials. Although they both serve the purpose, they are poles apart chemically.

PVP, a synthetic polymer of vinyl pyrrolidone, is a product of GAF's acetylene chemistry. Monomer is made from acetylene, formaldehyde, and ammonia, and polymerized to the desirable average molecular weight of 25,000. Resulting molecule is a structure of heterocyclic rings possessing an electrical charge associated with many biochemicals (i.e., amino acids).

Similar to glycogen: Dextran is a biosynthetic polysaccharide obtained from the fermentation of sucrose by the bacteria, Leuconostoc mesenterioides. Primary fermentation dextran is a crude glucose high polymer which is cracked by acids to give a material with an average molecular weight of about 72,000. This cracked dextran is the commercial product. It is an uncharged glucose polymer similar to glycogen, except that it is less branched and more resistant to hydrolysis by blood enzymes. There are many different dextrans according to the degree of branching. Commercial Solvents believes its sparsely branched product is the most favorable for clinical use. Dextrans may find an industrial outlet as thickeners for paints, printing inks, and ice cream.

Both PVP and dextran have decided advantages over human blood plasma. They are stable and last long without refrigeration. Their use eliminates the need for blood typing and the danger of transmitting disease, and they are readily sterilized. Price is a fraction of the cost for plasma. Most important is the ease with which large quantities of the synthetics can be manufactured, if the need arises. It has been estimated that in case of atomic attack on a major population center, supplies of blood plasma could not fill more than 5% of the emergency requirements. The remaining 95% represents a pool of several million gallons to be filled by the new plasma volume extenders.

Tight patents: With an eye on this substantial market, expansion of production is now under way. Commercial Solvents is spending $200,000 on its Terre Haute, Ind., facilities, and expects to finish the job in about three months. Although dextran is still a pilot-plant commodity, Commercial Solvents has plans for producing 20 million pints per year if demand materializes. One obstacle to these ambitious plans may be the tight control of patents now held by Swedish interests. Despite its conspicuous silence on this matter, it is reasonable to assume that Commercial Solvents will not sink its hard earned capital into a pre-doomed venture. Cost of dextran, now about $8 a pint, should drop to half this figure when full scale production is a reality.

General Aniline has its own blueprint for expanding PVP output. Semi-commercial production at Grasseli, N.J., now has capacity for turning out enough PVP for 25,000 pints of plasma a month. By May capacity will be expanded to supply PVP for 350,000 pints a month, and early next year GAF hopes to be able to turn out 1½ million pints worth. This spurt will be due in large measure to overall expansion of manufacturing facilities at Grasseli; all acetylene-based products will benefit.

Cost-wise, PVP appears to have a great edge. Enough PVP to make a pint of solution sells for about 45¢. This price will probably not drop too much even when production hits a rapid pace.

Okra and seaweed: PVP and dextran are the big guns in the plasma extender field, but they are not the whole story. Recently another product was obtained from okra by a research group under the direction of Dr. Hiram Benjamin at the Marquette University Medical School. Apparently the powdered material has all the attributes of its predecessors and does its work in much the same way. Still another entry is a starch known as laminarin, recently derived from seaweed in Scotland.

Despite the cry for the plasma extenders, all parties concerned are quick to point out none of their products will alleviate the medical requirement for whole blood.

The government is showing a lively interest in all of these products. National Research Council acting in an advisory capacity will make recommendations for purposes of purchasing for the armed forces. Stockpiling to meet the eventualities of air raids and mass civilian use will in all probability be handled by municipalities.

When Uncle Sam gives the green light, producers will begin supplying a tremendous future demand which they hope will never materialize.

Cold Cure Doubts

On the commercial side, antihistamines are being pushed with intensive consumer promotion, new application methods, laudatory articles in such popular magazines as the *Reader's Digest*. It all adds up to a sizable market for makers of the drugs and their intermediates. But on the scientific side, clinical results on large groups of human "guinea pigs" leave

the question of their efficacy against the common cold in grave doubt.

The uproar started over a year ago, when the *Reader's Digest* reported Brewster's cold cures with the drugs at Great Lakes Naval Hospital. About the same time several companies obtained Food and Drug Administration approval for selling their brands of antihistamines without prescription. The boom was on, and during the past year millions of Americans have popped tablets in their mouths at the first sniffle or sneeze.

The FDA has since clamped down on some of the more extravagant advertising claims, but there's still no doubt that the antihistamines are firmly entrenched in the family medicine chest—to the tune of something like $100 million's worth a year.

But the scientific fraternity isn't nearly so unanimous in its evaluation of the cold stoppers. Indeed, results of various clinical tests, all presumably carried out with utmost scientific objectivity, range from vindication of the drugs as a blessing to complete denial of their potency.

Pro: First results were, of course, firmly in the "pro" column.

Two new tests, reported this month, are also on the "pro" side, but not so insistently. Four doctors kept records on 8,300 patients, 5,600 of whom were given antihistamines, 1,500 other remedies, and 1,200 placebos (sugar pills.) The patients didn't know which they were getting. Relief of symptoms was 72.7% with antihistamines—which was 13.4% better than with other cold remedies and 18.5% better than with placebos.

The second report covered tests on 1,008 inmates of Lawton Reformatory, Washington, D. C. Of two nearly equal groups, one received an antihistamine and the other a placebo. Said Dr. Harold L. Hirsch, who conducted the trials, the antihistamine "does alleviate some of the symptoms and in some instances shortens the . . . disease by varying degrees."

Con: But up at Boston University Medical School, Drs. Lowell and Schiller divided 1,214 volunteers into four groups, gave them three different antihistamines and a placebo. The student volunteers reported to the campus office when they came down with colds and again, four days later, after the course of medication. On the basis of statistical analysis of results, the doctors concluded: "We are unable to distinguish any effect of the three drugs in the dosage used on the common cold that differed significantly from the placebo."

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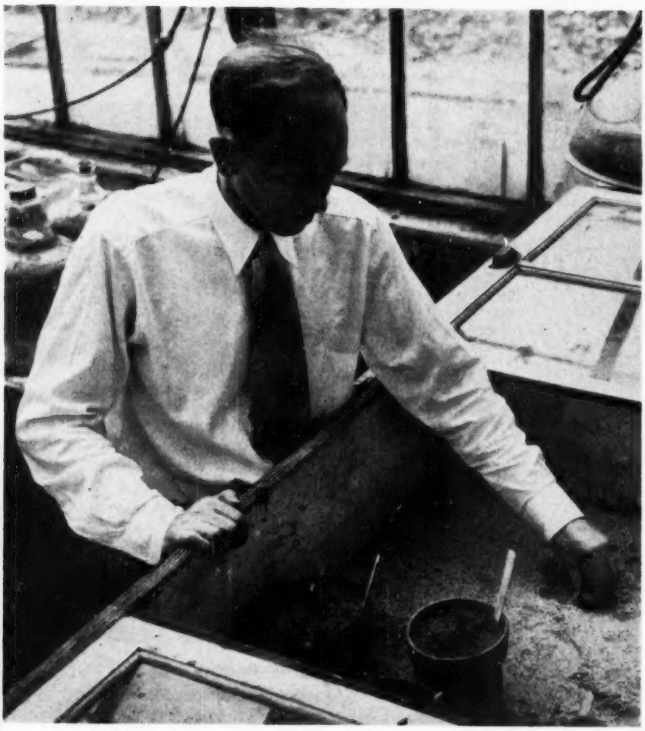
Formula Fed

Rearmament needs have thrown the spotlight on synthetic rubber. But a different, long-range approach to the rubber supply problem is U.S. Rubber Co.'s intensive studies of nature's own "factory," the rubber tree.

Leaning on an uncluttered desk in his glass-panelled office at U. S. Rubber Co.'s spic-and-span Passaic, N. J., general laboratories, Dr. John McGavack outlined the aims of research currently in progress at the firm's Paramus (N. J.) experimental station.

One of the nation's foremost authorities on natural rubber, John McGavack has the distinction of being "foreman" of the only rubber plantation within shouting distance of New York City. Here, the latex-producing secrets of the economically significant Hevea tree are under scrutiny. Objective: learning how to keep it healthy, happy, and productive to a ripe old age.

Cause and effect: Hevea seeds received from the Far East are planted in a greenhouse where the growth and development of the plant is observed under controlled conditions. Atmosphere is maintained uniformly hot and humid, closely simulating tropical plantation climate. Nutrients and soil environment are carefully



1 DR. C. E. RHINES plants seed of rubber-producing Hevea tree in hotbed of acid-washed sand, at U. S. Rubber Co.'s Paramus, N. J., experiment station. At an early stage in their development, trees are cut back and . . .

2 CUTTINGS TRANSPLANTED to special soil where they remain until they take root. Trees receive controlled nourishment from chemical solutions . . .

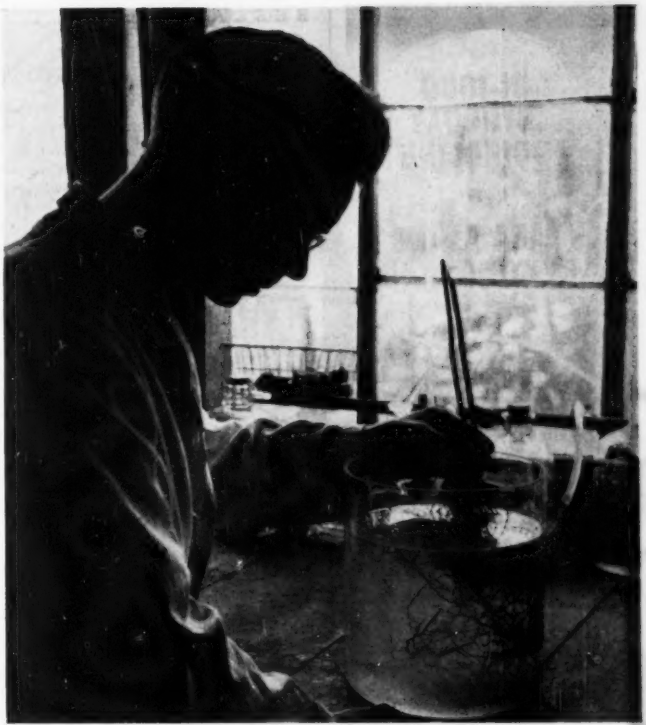
3 MIXED ACCORDING TO FORMULA by technician Charles Goetz. Water used for these solutions is double distilled to remove traces of plant nutrients.

regulated so that an accurate "cause and effect" relationship may be elicited for various growth variables. Even micro-organisms get their share of attention from the practiced eye of bacteriologist C. E. Rhines.

Strikingly stunted: Development of young trees on different experimental regimens is compared with suitable controls and an estimate of the efficacy of the experimental variable is obtained by the observed growth difference. For example, trees raised on sodium- and potassium-free diets are strikingly stunted compared to those not subjected to this handicap.

Although trees never reach maturity in the greenhouse—the roof is too low—observation of them is nonetheless contributing in large measure to the well-being of their senior Asiatic kin.

Added significance: Work now in progress at the indoor plantation takes on national significance in the light of stepped-up rubber requirements. This is not an unfamiliar turn of events for McGavack, whose three decades of industrial experience (since leaving Johns Hopkins) has been punctuated with generous spells of government service. New knowledge gained by his group, translated into practice, could ultimately provide more and better natural rubber.



4 AFTER YOUNG TREES HAVE TAKEN ROOT, they are unearthed. Roots are inoculated in special solution before transfer to large pots which are their home during their stay in the greenhouse.

5 TREES ARE WATERED, and fed measured amounts of their liquid diet by botanist John Hommes. Continued observation enables correlation of growth with nutrition.

6 DR. JOHN McGAVACK, director of the project, compares trees of the same age. Robust trees on his right were fed special diet. The one he holds received no treatment.

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Spinach Vitamin

A new vitamin recently discovered at Alabama Polytech's Agricultural Experiment Station, may be an important factor in human nutrition. On the strength of preliminary investigation, the substance which is related to folic acid, is now in experimental production at a leading pharmaceutical laboratory.

Although the vitamin—which goes by the name citrovarum factor—replaces folic acid (a B vitamin) in the diet of rats with excellent results, its real significance is in the possibility that it may be a new weapon to combat dreaded leukemia. The disease is often countered by administering certain anti-folic acid agents. Danger lies in not knowing when to stop, for over-administration may result in dangerous folic acid deficiency which cannot be remedied by the acid itself.

Hope for humans: Citrovarum factor, however, may be able to do the job. According to its discoverer, H. E. Sauberlich of Alabama Polytech, the new vitamin appears to be more effective than folic acid in overcoming folic deficiency induced in bacteria. The hope is that it will do the same for humans.

Research at the Auburn, Ala., experiment station, demonstrated that appreciable amounts of the newcomer are found in liver and green vegetables—especially spinach. In fact, concentrates of the substance prepared from liver and spinach have been used successfully with chicks to promote growth and feathering, normally a folic acid function.

Testing of the new material has so far been limited to experimental animals. Determination of its action on human subjects will have to wait for greater availability of a pure product. Steps in this direction are being taken by American Cyanamid's Ledele Laboratories (Pearl River, N. Y.), which now has the citrovarum factor in experimental production.

Key to 406

New intermediate, perchloromethyl mercaptan, is used in the synthesis of a soon-to-be-marketed fungicide. Other industrial applications now being studied give hope of wide industrial utility.

True to form, the compound possesses the stifling, over-ripe odor of a full fledged mercaptan. In spite of this handicap, the product's future looks bright as an intermediate in the preparation of lubricating oil additives, fungicides, dyes, pharmaceuticals, insecticides and a score of other profitable commodities.

Developed in the Phillipsburg, N.J. laboratories of J. T. Baker Chemical Co., the unpleasant-smelling yellow liquid made its debut late last year. Since then, production has been marking time, awaiting the starting-whistle from potential customers.

This will probably come when Esso's new synthetic fungicide, SR-406, hits the market in force. SR-406 contains as its active ingredient N-trichloromethylthio - tetrahydrophthalimide. The latter, a colorless crystalline solid is a potent fungicide, especially effective against fruit diseases such as apple scab and tomato blight.

Fights fungus: Apparently non-toxic to warm blooded animals, the fungicide is synthesized by using perchloromethyl mercaptan to introduce the trichloromethythio group into the phthalimide nucleus.

Field tests in this country and abroad have been completed to the satisfaction of the Standard Oil Development Co., and SR-406 has been approved for experimental distribution by the Department of Agriculture.

Final action on the label is now in the works with no obstacles expected.

Commercial production rights have gone to the California Spray-Chemical Corp. (Richmond, Cal.), which in turn has farmed out the manufacturing to Tennessee Products Corp. (Nashville, Tenn.).

Might make their own: If SR-406 lives up to its notices, its commercial success is a good bet. Although this eventuality would seem to open a sizable, made-to-order market for perchloromethyl mercaptan, it is always possible (when business warrants it) that producers of the fungicide will set up their own facilities for production of the intermediate.

Eskimo Resin

New polyvinyl chloride resin retains flexibility at temperatures considerably lower than others of its family. Largest market will be aircraft wiring-insulation.

Small but progressive Resin Iudustries of Santa Barbara (Cal.) claims credit for the resin that remains flexible at —100 F. This is an improvement of about 35 degrees over conventional polyvinyl chloride resins. According to president Grant Ehrlich: "there's nothing really unusual in the compound, just the particular combination of the material."

Although the particular combination is still hush-hush, there is nothing secret about the principal use for the improved material. Excellent low temperature-flexibility points to electrical insulation for aircraft.

Resin Industries manufactures extruded plastic tubing for blood plasma kits, sprinkler systems, and such consumer products as garden hose, plastic covered clotheslines, etc. Its new low temperature extruded tubing will be distributed nationally under the trade-name, Resinite.

High hopes: With today's stratosphere aircraft operating in temperatures as low as —114 F, Ehrlich hopes his freeze-proof polyvinyl resin will find a soaring market.

•

New rubber plasticizer named Rub-R-Vive by the Schwartz Chemical Co., Inc. (New York City) should extend the useful life of aged rubber surfaces. Applied to hardened or cracked rubber, the material plasticizes the rubber and reportedly restores the resilience and performance of new rubber.

•

Identification of wood types is facilitated with chemical tests developed in conjunction with forest fire-prevention efforts in the Pacific Northwest. Confronted with the problem of identifying partly decayed wood at old logging sites, Dr. E. E. Hubert, research forest pathologist at the University of Idaho, discovered that a benzidine solution would give an orange-red color to white pine, and black to fir.

The rapid chemical test replaces laborious microscopic processes. Research still in progress is aiming at the discovery of other reagents suitable for wood identification.

•

R-108, a new General Electric coating intermediate has been designed to permit formulations of coatings that combine best properties of vinyl and phenolic types. Prepared from phenol derivatives, the intermediate combines superior chemical resistance with flexibility and heat resistance. It is easily colored with a wide variety of pigments, i. e. titanium dioxide, iron oxides, graphite, mica, clays, chromates, etc.

Product may be applied by brush, dip, spray, or roller, and baked in standard equipment by conventional techniques. Properly cured, R-108 has excellent adhesion to metals, glass, wood, and plastics.

Indicated uses are coatings for drums, tank cars, appliances, food containers, and process equipment.

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PRODUCTION . .

Horizontal Kaskade

New horizontal design for Koch Engineering Co.'s Kaskade distillation-column tray is now in production.

Its strong point: 30%-40% more fractionation for a given pressure drop than can be obtained with a conventional bubble tray.

Liquid-liquid extraction may also be an important application, since the tray is more efficient than a packed tower.

The horizontal Kaskade tray was described for the first time last week by Koch's "Skip" Thrift.* Although it's still too early for its properties to have been completely explored, it's already apparent that it has some solid advantages over the conventional bubble trays in many applications.

The new design is particularly useful, says Thrift, for high vapor and moderate to low liquid loads. Pressure drop for a given degree of fractionation is extremely low—sometimes as low as 1 mm per tray. (For operation at high liquid rates, as in an absorber, the older type of Kaskade tray is better than the new.)

A high degree of operating flexibility is another advantage of the new tray. This is especially important for small chemical plants, which may have but a single distillation column. When production orders fall off, a larger plant can simply cut out one or more of the columns from a multi-column set-up; but the smaller plant has to slow down the operating rate of its single column. In fact trays based on the new design can, if it could conceivably be desired, be throttled down to practically no liquid throughput.

Operation: In the operation of the new horizontal tray, liquid reflux from the plate above passes into a liquid well. From this well it pours onto the plate proper, which is made up into two sections. The lower section of the tray is made up of a series of solid metal strips, all curved in the same direction. The upcoming vapor rises between these curved sections and hits the liquid reflux which is pouring across the top and throws it against a series of vertical screens set above the curved sections. The screens serve both as a contacting device and as a means of separating liquid from vapor. This process is repeated on the next tray.

Liquid-liquid extraction may be another important application of the new tray design. This operation has heretofore been the province of the packed tower, but the horizontal tray is more flexible in its operating characteristics. Further, pilot plant data indicates that tower height for a given extraction can be halved. The low pressure drop which makes this possible also makes the new design extremely valuable for liquid-liquid systems where the gravity difference between the two phases is very small. Commercial towers have been operated where the difference in specific gravity is as low at 6%.

"SKIP" THRIFT: The bubble cap has a new competitor.

If the continuous phase is the lighter of the two phases, the tray is generally used in the normal position. However, if the heavier phase is the continuous phase the tray is often inverted.

Cost of the new horizontal tray is roughly the same, for a specific duty, as for bubble cap trays. However, smaller trays are required. Thus there is an additional saving on the cost of the tower itself and the needed foundations.

Maintenance (the major operating cost) of the new type tray is roughly 50%-75% of the cost of maintaining the same square footage of bubble trays. And there are fewer square feet to be maintained.

* Occasion: meeting of the New York Section of the American Institute of Chemical Engineers.

Inspector X

Newly developed crystals will replace complicated and cumbersome systems of vacuum tubes and amplifiers in industrial x-ray testing equipment. Product of General Electric X-Ray Corp.'s research, the new crystals amplify impinging energy a million times, promise more precise testing.

Already in operation are laboratory models of testing equipment incorporating the crystals. They're being used to inspect rubber heels; product level of baby food, beer, soup and other packaged products; and continuity of powder trains in blasting fuses.

High speed: Speed of canned food inspection can go as high as 600 units a minute.

FRERICHS AND JACOBS: A tiny crystal makes a big eye.

Testing equipment can also be used to ferret out voids, cracks and thickness variations of various materials, and foreign particles can also be detected.

More than one: Rudolf Frerichs, of Northwestern University, and his former student, John E. Jacobs, of G-E X-Ray Corp., have been growing the crystals in the company's Coolidge Laboratory for some time.

Small crystals are used for small jobs. Large crystals can be grown, but it is the company's practice to use a battedy of crystals to cover a large area.

Safety is an important advantage in using the crystals. A large spray of x-radiation is not required as in conventional x-ray machines; narrow, pencil-like beams are often quite suitable. This radiation hazard is reduced as is also the cost of initial installation.

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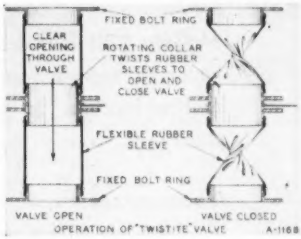
Twist to Close

The double closure of Stephens-Adamson Mfg. Co.'s new Twistite double-closure bin valve is effected by twisting two rubber sleeves. Rotation of a cable-operated steel collar provides the twist. The cable is under tension when the valve is in the closed position, so the valve snaps open when the cable is released.



Rubber's natural flexibility allows the sleeve to wrap itself firmly around any particle passing through the valve at time of closure.

The cable can be run to any desired point, permitting remote operation of the valve; and control can be by hand or automatic.

Sizes range upwards from 6" internal diameter. The 6" valve can handle lump material up to 2½" in diameter.

Sleeve Cooler

Arrival of warm weather was at one time a signal for trouble at Mathewson Chemical Co's. plant at Atlanta, Ga. The heat caused a curious phenomenon in removal of methyl chloride, ammonia, and other volatile refrigerants from tank cars prior to bottling for distribution.

During warm periods, it was found that, after two-thirds of a tank car was exhausted, release of pressure and high temperature caused the remaining liquid to gasify. This caused the pumps used for the bottling to spin without exhausting liquid from the tank car. Eventually pressure increased greatly as the temperature rose, and much gas was lost.

Cool it: When called upon to survey the problem, Gordon L. McWilliams of Refrigeration Appliances, Inc. came up with the answer. He refrigerated the 60-foot steel pipe which carries the gas from tank car to bottle filling unit.

The pipe was cooled by converting it into a heat exchanger. A copper coil was wrapped around the pipe to carry refrigerated water. The coil was then jacketed and provided with a cork overlay. Reducing the temperature of the pipe to 45° F was sufficient to keep the contents liquid and permit them to be pumped out.

Less than a month was required for the installation to pay for itself.

•

Electronic recorder: Leeds & Northrup Co. has just introduced a new Speedomax electronic recorder. Featured is a range which is continuously adjustable over a 20:1 ratio. The zero point can also be suppressed so that the instrument records only the desired portion of the range. Thus the sector of, for example, the desired portion of the temperature spectrum is spread across the entire chart width to increase accuracy.

•

Beaker handle: The new handle on a 3,000 ml. Pyrex beaker will be a boon to all laboratory workers. Handling hot beakers of this size has always been a serious problem. In the new beaker a large glass handle is firmly attached to a stainless steel band which fits around the top of the beaker and also serves as a protective collar. Handles and bands are interchangeable and are readily removed.

•

Disc disperser: In Chaffee Design & Manufacturing Co's. new disc disperser, emulsions are found by forcing the two components by feed screw pressure through alternating perforated plates and shearing knives. The shearing knives revolve at high speed between the discs and provide positive shearing action. Thus the new disperser does not require any cooling apparatus because of the small amount of heat generated.

•

Specific gravity measurement: In the Densitrol, new liquid-measuring instrument made by Precision Thermometer & Instrument Co., a totally submerged plummet provides a direct reading of the specific gravity on a 5" scale. The plummet is self-centering and is held below the surface by a chain attached to both sides of the measuring vessel. Models can be supplied with a thermometer so calibrated that it will provide a direct temperature correction.

•

Flow regulating valves: The Swartwout Co. has introduced a complete line of flow regulating valves to handle steam and water when discharged under high pressure. It is particularly suitable for all services where high-velocity impingement necessitates frequent maintenance service.

It's time we got *working* mad!

As we listen to the latest insults from Moscow, we're likely to get fighting mad.

Instead, we'd better use our heads and get *working* mad.

It is clear by now that Stalin and his gang respect just one thing—strength. Behind the Iron Curtain they've been building a huge fighting machine while we were reducing ours. Now we must rebuild our defenses—*fast.*

As things stand today, there is just *one* way to prevent World War III. That is to re-arm—to become strong—and to stay that way!

This calls for better productivity all along the line. Not just in making guns, tanks and planes, but in turning out civilian goods, too.

Arms must come first. But we must produce arms *at the same time* we produce civilian goods.

We can do this double job if we all work together to turn out more for every hour we work—if we use our ingenuity to step up productivity.

All of us must now make sacrifices for the common good. But we're working for the biggest reward of all —*peace with freedom!*

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MONSANTO
CHEMICALS for PLASTICS

FOR YOUR INFORMATION

Every month Monsanto publishes these pages of pertinent information. Here you will find suggestions and application ideas selected to help you improve your products, lower your production costs, increase your sales. More information will be furnished on request.

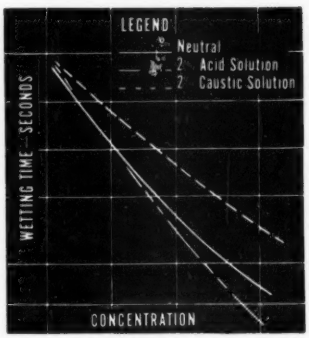
Santomerse No. 1 serves many industries in numerous ways

Monsanto Santomerse* No. 1 is called the all-purpose detergent and wetting agent because it efficiently serves so many industries in operations requiring a cleaner, a wetter, a penetrant, an emulsifier, a dispersing agent.

Santomerse No. 1 is an alkyl aryl sulfonate compound having a minimum of 40 per cent active ingredient. It is effective in acid or alkaline solutions . . . in hard or soft water . . . at all required temperatures.

In addition to its extensive use as a general-purpose cleaner, Santomerse No. 1 has an important place in many operations. For example, it has proved itself extremely valuable in the acid bath for cleaning, treating or pickling metal. It increases the rate of acid action, aids in the removal of surface oils, thereby insuring uniform action of the acid, and gives a quick and more complete drain-off of the solution and objectionable residual salts.

For more details on the use of Santomerse No. 1 in this and numerous other industries,



Comparison of Santomerse No. 1 wetting action on neutral, acid and caustic solutions.

contact the nearest Monsanto Sales Office or mail the coupon for your free copy of the 20-page booklet, "Santomerse No. 1 All-purpose wetting agent and detergent."

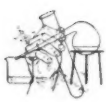
Aroclors give paints endurance to stand up under severe service

If you have a tough job for a maintenance paint, choose one that's formulated with an Aroclor.*

Monsanto Aroclors (chlorinated biphenyl and chlorinated polyphenyls) make paints resistant to corrosion . . . give them superb adhesion . . . make them stable to light . . . give them tough, nonporous films.

The Aroclors are used extensively in rubber-base paints for stucco, masonry, steel and wood . . . in corrosion-resistant coatings for pipe lines, tanks and chemical plants . . . in fire-retardant coatings and in marine paints.

If you manufacture paints, we suggest that you investigate the use of Aroclors' product-improvement possibilities. Information is available without obligation from any Monsanto Sales Office or literature will be sent when requested by letter. In asking for literature, please tell us the use that you have in mind for Aroclors so we can send you information that will be of greatest service to you.



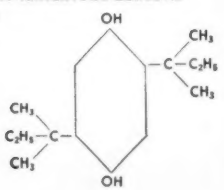
Research Chemists' Corner

You may find something new here

If you are developing something new in chemicals . . . or if you're looking for something to replace a scarce material . . . look at the properties of Monsanto Di-tertiary-amylhydroquinone. You may find the answer to your problem. If, after reading the information here, you want to experiment with the material, contact the nearest Monsanto Sales Office or mail the coupon for a sample.

DI-TERTIARY-AMYLHYDROQUINONE

Structure:



Appearance: White to buff powder.

Specific Gravity: 1.05 at 25° C.

Melting Point: 165° C. min.

Solubility: Very soluble in acetone, soluble in ethyl acetate.

Moisture: 0.5% max.

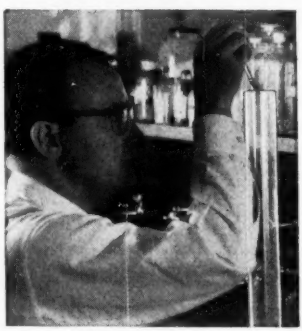
Ash: 0.5% max.

Reactions: Very weakly acidic and only partial reaction with aqueous sodium hydroxide.

Sodium salt may be formed by reaction with sodium metal in liquid ammonia.

Chlorine and bromine may be introduced into the ring.

AE-1 eliminates foam



THIS EXPERIMENT, conducted in Monsanto's Food Technology Laboratory, shows the effectiveness of AE-1, Monsanto defoaming agent. AE-1 may hold possibilities in the manufacture of yeast, textiles, adhesives, paints, steel and in other industries. If you have need for a defoamer, investigate AE-1. Mail the coupon or contact the nearest Monsanto Sales Office for details.

375 to 500 times as sweet as sugar... and without calories!

Saccharin Monsanto adds sweetness without calories. It will not ferment or mold and it is nonirritating and nonpoisonous. That's why Saccharin Monsanto is called "the perfect sweetener."

Saccharin soluble granular is 375 times as sweet as sugar, and saccharin soluble powder (anhydrous) has 425 times sugar's sweetening power. On the basis of sweetening, saccharin at $2 a pound is cheaper than sugar at 9¢ a pound.

When Monsanto was founded in 1901, its first product was saccharin. Today, Monsanto manufactures more saccharin than any other company in America.

Monsanto produces saccharin in these forms:

Saccharin Insoluble Powder—White crystalline powder (approximately 100 mesh); loss on drying, 0.5% maximum; melting point, 227.0° C. minimum to start; purity, 98.0% minimum.

Saccharin Sodium Soluble Powder, U.S.P.—Fine white powder (approximately 140 mesh); loss on drying at 125° C., 5.8% maximum; solubility in water, 1:8 complete.

Saccharin Sodium Granular, U.S.P.—Fine white crystals (approximately 10 mesh); loss on drying at 125° C., 14.35% maximum; solubility in water, 1:8 clear.

The principal uses of saccharin are in flavoring beverages, pharmaceuticals, foods, mouth washes, dentifrices and tobacco. It is substituted for sugar in diabetic foods.

Monsanto offers two interesting pieces of literature on the product: "*Saccharin—The Perfect Sweetener*" and "*The Sweetest Story Ever Told.*" The latter booklet contains recipes for many delicious desserts in which saccharin is used as the sweetener. Copies of this literature will be sent free upon request. The coupon is for your convenience.

Honey mesquite meets its match in Monsanto 2,4,5-T

Honey mesquite, infesting millions of acres of rangeland, has met its master in a Monsanto herbicidal chemical, 2,4,5-Trichlorophenoxyacetic Acid. On some future day, when enough 2,4,5-T and spraying equipment are available, mesquite can become a memory . . . no longer hiding cattle gone wild . . . no longer crowding grass from grazing land . . . no longer plaguing cowboys with its thorns.

The effectiveness of 2,4,5-T in controlling honey mesquite has been proved in experiments in Texas over a three-year period.

While thousands of chemicals have been tested, 2,4,5-T appears to be the *only* material that is satisfactory on *all* points for large-scale applications. Based on its results, one of those conducting the experiment says, in part:

" . . . it appears that mesquite may be controlled by the application of ⅔ pound of a low-volatile ester of 2,4,5-T in 1 gallon of diesel oil and 3 gallons of water."

The herbicide should be applied by an experienced man, properly equipped, during springtime when mesquite is in full leaf and making rapid growth. It appears that control will be effective for from five to ten years at an economical cost.

The present demand for Monsanto 2,4,5-T Acid exceeds the supply. However, research on 2,4,5-T and other herbicidal and insecticidal chemicals continues unabated.

Typical honey mesquite in pasture, Pitchfork Ranch, Spur, Texas.

The same field after the application of Monsanto 2,4,5-T ester.

Ortho-NITROBIPHENYL, plasticizer and intermediate, price reduced

If you are having difficulty in getting plasticizers, or if you need an efficient intermediate that is available, investigate Monsanto's ortho-nitrobiphenyl, technical (also known as ortho-nitrodiphenyl). A recent price reduction makes ortho-nitrobiphenyl more economical than ever.

Details on ortho-nitrobiphenyl and on other intermediates are contained in Monsanto's intermediates catalog which is just off the press. You may obtain a copy by contacting the nearest Monsanto Sales Office or by requesting one on the coupon.

Intermediates now available—Monsanto Salt (Sodium ortho-chloro-para-toluenesulfonate). Ortho-Aminobiphenyl. Ortho-Nitrobiphenyl. Toluenesulfonic Acid.

Intermediates which may or may not be available—Benzyl Chloride. Benzoic Acid, Technical. Cyclohexylamine. Dicyclohexylamine. Dinitroaniline. Dinitrochlorobenzene. Meta-Chloroaniline. Meta-Nitrochlorobenzene. Ortho-Nitrochloroaniline. Ortho-Anisidine. Ortho-Phenetidine. Para-Anisidine. Para-Phenetidine. Para-Chloroaniline. Salicylic Acid, Technical. Thiourea.

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MONSANTO CHEMICAL COMPANY, 1703-B South Second Street, St. Louis 4, Missouri. District Sales Offices: Birmingham, Boston, Charlotte, Chicago, Cincinnati, Cleveland, Detroit, Los Angeles, New York, Philadelphia, Portland, Ore., San Francisco, Seattle. In Canada, Monsanto (Canada) Ltd., Montreal.

*Reg. U.S. Pat. Off.

MONSANTO
CHEMICALS for PLASTICS

SERVING INDUSTRY... WHICH SERVES MANKIND

SEND INFORMATION: ☐ AE-1. ☐ 2,4,5-T. ☐ The Aroclors for_____

SEND LITERATURE: ☐ "Saccharin—The Perfect Sweetener." ☐ "The Sweetest Story Ever Told." ☐ Intermediates Catalog. ☐ Booklet, "Santomerse No. 1."

SEND SAMPLE: ☐ Di-tertiary-amylhydroquinone.

MONSANTO CHEMICAL COMPANY
1703-B South Second Street, St. Louis 4, Missouri

Please send, without cost or obligation, material indicated at the left.

Name.....Title.....

Company.....

Street.....

City.....Zone.....State.....

Cedar Waste Cleans Boilers

Waste cedar shavings are the raw material for a novel organic boiler compound called Borgana.

Backed by the product's wide acceptance in the Pacific Northwest, its manufacturer, Portland Shingle Co., is now pushing it in the Midwest and East.

Also in the offing: Borgana's introduction as an automobile radiator cleaner.

The manufacturing process involves breaking down waste from cedar logs through hogging (tearing into chips with a machine the lumberman calls a hog). The material is then placed in a wire basket which is immersed in a vat of water heated to a temperature just below the boiling point. After boiling, the remaining waste is put through a hydraulic press under a pressure of 2,000 psi. The amber colored fluid drained from the press is merged with liquid remaining in the vat, and the process is then repeated six times to concentrate the organic extract.

This process is the outgrowth of a discovery made back in 1913 by Guy J. Bailey, then a young stationary engineer working in a sawmill near Port Angeles, Wash. The mill received its boiler water supply from springs in the area. The water was hard, and Bailey had to devote every Sunday to chipping scale off the boiler. Then one day it happened. The pipeline from the springs broke and the water supply was cut off.

Only one source of water remained —a pond of stagnant water half filled with discarded bark, shavings and outrun of cedar logs. So the water from this pond was poured into the engine's boiler.

The next Sunday when young Bailey started his usual job of scale chipping, little scale was found. So he continued to use pond water, and within four weeks the boiler was clean as new.

Years passed and Bailey continued to work as engineer in shingle mills, always using, up to a certain point, cedar-contaminated water to keep his boilers clean. There was one bug, however. After removing corrosion, acids in the compound began eating into metal.

Some 15 years ago Bailey decided to attempt commercial production. But first he had to find out what was damaging the boilers and what to do about it. Long experiments brought the desired results; the process developed removes the acids which

GUY BAILEY: From a cedar waste pond, royalties on a boiler compound.

cause boiler damage, leaving tannic acid,* cedar oil and other unnamed chemicals.

Two years ago Bailey entered into an arrangement with the Portland company for commercial production on a royalty basis. First a pilot plant was set up, and today a plant adjacent to the company's shingle mill is producing Borgana (boiler organic) at the rate of 12 barrels per 8-hour shift. The product is sold in 1-gal and 5-gal drums at $12 and $35 respectively.

Borgana both removes and prevents boiler scale. Application is made directly into the boiler water through an injection or through feed pumps. Regular rate of treatment is one quart of the concentrate a week per 100 boiler hp. The rate is doubled while removing heavy scale or corrosion.

In widening its markets, Portland Shingle is not concentrating sales effort on any particular industry, for it hopes to sell Borgana "every place there are boilers." Distributors handling the product are stressing that it is a waste wood product, needs "no critical chemicals" for its manufacture.

Stepped-up promotion to industry is not the extent of the company's ambitions for Borgana. The producers plan to introduce it in the automobile field as a radiator cleanser.

Bailey, the discoverer, while having no connection with the manufacturing business beyond receiving royalties, retains an unofficial interest in the project. He is sales manager for the state of Washington, under Balfour, Guthrie, Inc., Borgana distributors for 11 western states.

* Tannic acid or tannin extracts, chiefly from quebracho, chestnut, and cutch are well-known as boiler compounds, either alone or in combination with such inorganics as phosphates, soda ash, sodium silicate, caustic soda.

Liquid Assets

Zippy Products expects to sell four million cases of its liquid laundry starch this year, climaxing a steady climb from 100,000 in 1945, the first year it hit the market. Although unopposed when introduced, Zippy Liquid Starch now has over 100 competitors. But strong advertising support and a network of franchised manufacturers are keeping it in the fore.

Advertising allocations for the coming year will probably be the biggest in the history of the Lansdowne, Pa. company since they are based on case sales figures. These will reach the order of $100,000, all to be spent in television. Franchised dealers are expected to equal that expenditure, making a total of $200,000.

Quite unusual for a household specialty manufacturer, Zippy Products never uses newspaper advertising. This stems from an unhappy experience when it first came out with the starch under the name "Jiffy."* A test campaign run in newspapers in Harrisburg, Pa., cost a lot of money, but failed dismally, souring owners William R. Shunk, Robert F. Boyce and Charles E. Winter (deceased) on that approach to the consumer.

Patent on the liquid starch was the property of the late Joseph Pecker, a Philadelphian. Shunk and Boyce made an arrangement with Pecker in November, 1944 to produce and distribute the product. Today Zippy Products, Inc., of which Shunk is president and Boyce, vice-president and sales manager, produces it under a royalty basis agreement with the Pecker estate.

At the time the two men took on the then new specialty, they were selling agents for various products and also controlled Candycrafters, Inc.

* Name changed to Zippy and registered as a trade name in 1947 when a dry starch was discovered on the market under the Jiffy name.

(candy) and Skyline, Inc. (toys), still operated by them in adjoining buildings in Lansdowne. (Boyce was a food broker, too, and still is, distributing Zippy via R. F. Boyce Co., Philadelphia.) They took a flyer in the business mainly because the initial investment was small. Opening a modest bottling plant, they began distribution door-to-door.

Army, Navy and Marine post exchanges in the East were the outlets for the first sizable distribution. At the war's end, when most of the war wives took up housekeeping in various parts of the country, they began to ask grocers for thefr old laundry standby. Orders for Zippy began pouring into the Lansdowne office, and facilities had to be rapidly expanded.

Because the new company did not have sufficient production for national distribution, and because of the tremendous shipping costs (40 lb per case is the weight), it decided to set up franchised manufacturers and distributors. This program went into effect in 1946. Zippy supplies the formula; all mixing, bottling and distributing is done from franchised offices in Los Angeles, Seattle, Chicago, Detroit, Atlanta and Memphis.

The Lansdowne plant originally supplied the eastern territory from New England through Richmond, Va. In 1948, however, the company built a plant in Woodburn, Mass., to serve New England. This is not part of the franchise set-up, is wholly-owned by the parent organization.

From the large number of competitors in the field—Argo, Sta-Flo, Linit, Londre, Snappy, Thrifty, E-Z, Unity are among the biggest sellers—it is obvious that making liquid laundry starch is no great trick. Shunk naturally won't reveal the particular "secret" of the Zippy product; says it contains the usual home starch, a little wax to lubricate the iron, bluing, another chemical to prevent lumping of the mixture and a preservative.

Since the introduction of liquid laundry starch, plastic (resin-based) liquid starches have come along. Despite the latter's relative permanency as a finish and the claim that they increase the life of clothes, the earlier liquid products have continued to gain. Part of this may be explained by housewives' wanting to treat an entire wash with one strength starch (with permanent starches, some clothes usually have more residual finish than others, making over- and/or under-starching a constant hazard); more of it can be attributed to greater defection in the ranks of dry starch users. Dry starch dollar volume sales have fallen behind liquid starch, but dry starch, bolstered by cold-water soluble products, still tops the liquid in unit sales.

Zippy's growth certainly has been meteoric. In 1945, about 100,000 cases were sold; in 1948, 0.5 million; last year, over 1.1 million. And this year, if bottles are available, the company expects to approach the 2 million mark. These figures hold only for the parent company; the national figure is double that since all the regional offices combined just about equal the home office. Each case contains 12 quart or 6 half-gallon containers, so the grand total may hit upwards of 45 million quarts.

LIQUID STARCH: Zippy users to consume four million cases.

On the east coast, Zippy outsells all other brands of liquid starch; in its home town of Philadelphia, it outsells all other brands combined. Yet Zippy is selling at a higher price than competitive products. The quart bottle now sells for 23 cents, having sold originally for 19 cents. Price of the half-gallon jug is twice that of the quart less five cents. These are the only two packages distributed by the company.

Money in Mildew

A small southern company achieves national distribution of its first chemical specialty, an anti-mildew compound, by initially exploiting outlets in the mildew belt. It is now increasing its capitalization and planning to add to its line.

Resco, as the new product is called, is based on a quaternary ammonium compound—benzyl dimethyl lauryl nitrogen complex—which is present in 2% concentration. It also contains triethylene glycol, a chemical that has received much attention for air sterilization. The formulation is claimed to destroy mildew, germs, odors and fungus. Among its distributors are Sears, Roebuck & Co.; the A & P; department, drug, hardware, house furnishing and farmers' supply stores.

Research Laboratories Corp., the Durham, N. C., company making this specialty, is a modest enterprise with 54 stockholders who have paid in its present capital of $100,000. However, with Resco established on a national basis, an increase in capitalization to $1 million has been voted. The stock will be sold privately. New products are under development at its small laboratory outside of Durham, N. C., and will be added to the line which includes, besides Resco, general food products.

No chip off the block: President and general manager of Research Laboratories is Marshall Barnum, great nephew of P. T. Barnum of circus fame, and a man of wide business and engineering experience.* He says that about $35,000 was spent in two years' research to produce the company's non-toxic fungicide and deodorizer. Pilot plant production in the summer of 1949 was followed by wide testing, especially in places with high humidity and temperature such as New Orleans and Florida. Further work was carried on in the mildew belts along the Atlantic and Gulf coasts, the Pacific coast and along the lower Mississippi. Barnum, a large commanding man, takes pride in the time and money spent in development, emphasizing, "We are manufacturers and engineers, not promoters."

Early in 1950 Resco was placed on the market in 6-, 12- and 32-oz. bottles at 89¢, $1.49 and $3.19, respectively. Since the product may be applied by wiping, immersion or spraying, a plastic tube with a spring-sprayer and guard is fastened to the bottles. It is also sold in gallon containers listing at $7.70. There are special prices for 55-gal. drums and tank car lots. The product is shipped in glass-lined drums and tank cars.

Wide field of use: Quaternaries, being cationic, are substantive to cellulose. Thus Resco is being used by laundries to prevent mildew from forming on damp-dry clothing and to combat perspiration odors. It also de-

* Holder of degrees from Cincinnati and Yale Universities, Barnum was an air force colonel in World War I; vice-president and general manager of the Daystrom division, American Type Foundry Co.; vice-president and general manager of Franklin Machinery Co.; and assistant to the president of the American Machine and Foundry Co.

INDUSTRIAL CHEMICALS

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Hydrazine
Semicarbazide
Hydrochloride
Thiosemicarbazide
Aminotriazole
Benzotriazole
Nitrobenzimidazole
Boron Nitride
Sodium Azide
Selenium Dioxide

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Send For This Valuable Mailing List Data!

To aid you in planning your direct mail, check any of these mailing lists you may be interested in . . .

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- ☐ Electrical Appliance Dealers
- ☐ Manufacturing Industries
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- ☐ Aviation Industries
- ☐ Bus Industry
- ☐ Chemical Processing Industries
- ☐ Civil Engineering and Construction Industries
- ☐ Coal Mining Industries
- ☐ Electrical Industries
- ☐ Electronic Engineers
- ☐ Food Industries
- ☐ Metal Mining Industries
- ☐ Power Plant Engineers
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stroys wild growth of spores in bakeries and mildew or mold growth on garden plants; prevents mildew on leather articles. Farmers use it in poultry houses to kill odors and bacteria. Physicians, dentists and hospitals find it an effective cold solution sterilizer. Coca-Cola and other bottling plants use it for spraying bottles, and the United Fruit Co. has painted it on storage bulkheads used for bananas and other fruit. In the home, it is also used for spraying garbage cans, refrigerators, kitchen cabinets and other household articles.

MARSHALL BARNUM: His great-uncle would approve.

Although Research Laboratories placed initial sales effort on areas where mildew is a persistent problem, it has since achieved national distribution and has also shipped to South America. Part of its success in moving its product can be attributed to the inventory control slip in one of three colors pasted on each bottle and gallon can. This is also a PM for salesmen when attached to a card with the salesman's name, address, name of store, approval of buyer and date. The salesman makes 5¢ for a white stamp from a 6-oz. bottle; 20¢ for a blue stamp from a 32-oz. bottle; and 50¢ for a green stamp from a 1-gal. can. Space on the collect-postage card allows for 20 stamps. Barnum may not consider himself a promoter, but he certainly knows how to merchandise the fruits of his research investment.

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Car ignition spray: Krylon, Inc., Philadelphia, has slightly redesigned its clear acrylic plastic aerosol for the automotive trade, changing the name to Automotive Krylon, and is launching a promotion program to the trade for "Krylon-izing"—spraying the ignition system of autos and trucks every six months as protection from the weather. This advertising and merchandising program is aimed at making this waterproofing a national habit by showing dealers, distributors and repairmen that the idea will mean additional revenue to them. It is also pointing out that this is a patriotic measure since it will extend the life of materials that may be in short supply soon.

Actually, a mechanic using the aerosol dispenser, can do the job in 15 minutes with only 40 cents worth of plastic. The manufacturer is suggesting that a mechanic charge $5 for the job.

In case lots of 12, 40% discount is permitted the shop owner. That makes the price $17.21 a case. On less than case lots, a 33⅓% discount is allowed.

•

Research on hair: The Toni Co. has earmarked $0.5 million for 1951 research on the physical and chemical properties of human hair and skin. Work will be done at the company's laboratories in Chicago and St. Paul, and in universities and independent labs. Part of the program will be a continuation of its Chicago clinic where women get complimentary waves in return for periodic inspection of their scalps and hair by Toni researchers.

•

Dry cleaning soap: A product that is both a detergent and an emulsifier is Pennsylvania Salt Manufacturing Co.'s new dry cleaning soap, Thriftex, for use with all petroleum solvents. As is apparent from its trade name, the product has been designed for economy.

Thriftex can be used directly from the drum or made up into stock solutions. It rapidly emulsifies moisture in the solvents, forming emulsions that are stable for months. The product can also be used in a two-soap method or in hand brushing or pre-spotting. It is presently available only in 5-gal cans or 55-gal drums because of the tight container supply.

•

Non-resistant fly strain: Non-members as well as regular members of the Chemical Specialties Manufacturers Association may now obtain pupae of the 1951 CSMA Fly Strain from Dr. Frank Hazard, Wilmington College, Wilmington, Ohio. There is no charge for this strain which is to be used for testing liquid sprays by the Peet-Grady Method in conjunction with the CSMA 1951-52 Official Test Insecticide. It was developed by cross breeding of four generations of flies that were non-resistant to commonly used insecticides.

ORONITE POLYBUTENES

help make a variety of products better

Oronite Polybutenes have been tried and proven in many applications. They are produced in selected grades of viscosity, carefully engineered and application tested to meet exacting requirements. Broad scale use of these products attests to the ability of Oronite to combine quality and quantity in the production of basic ingredients for better products.

ORONITE CHEMICAL COMPANY

THE NAME TO WATCH IN CHEMICALS

A partial list of other Oronite Chemicals

NOTICE
Some of the following, including the Polybutenes, are currently in short supply.

Detergent Alkane
Detergent Slurry
Detergent D-40
Detergent D-60
Wetting Agents
Lubricating Oil Additives
Cresylic Acids
Gas Odorants
Sodium Sulfonates
Purified Sulfonate
Naphthenic Acids
Phthalic Anhydride
Ortho Xylene
Para Xylene
Xylol
Aliphatic Acid
Hydroformer Catalyst

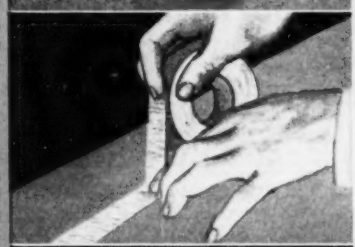
Here are 3 major uses for Oronite Polybutenes

MOLDED RUBBER SPECIALTIES

As plasticizers and softening agents, Oronite Polybutenes increase tear resistance, improve molding characteristics, inhibit bloom and aid pigment dispersion in a wide variety of molded rubber products . . . (in everything from garden hose to noise and vibration insulation compounds and hot water bottles).

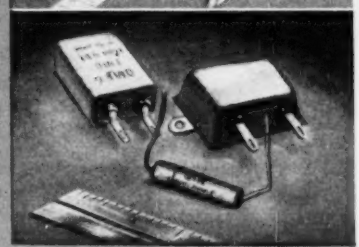
ADHESIVES

Oronite Polybutenes contribute outstanding adhesive and tackiness properties to industrial and surgical tapes, and label adhesives. Used either in natural form or in emulsions, they aid stability and add to moisture resistance.



ELECTRICAL INSULATION

Because of their high dielectric strength and low power factor, Oronite Polybutenes are excellent impregnating agents for paper insulation. These polybutenes are stable and tacky and are resistant to moisture and oxidation.



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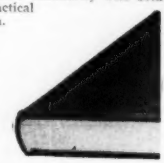

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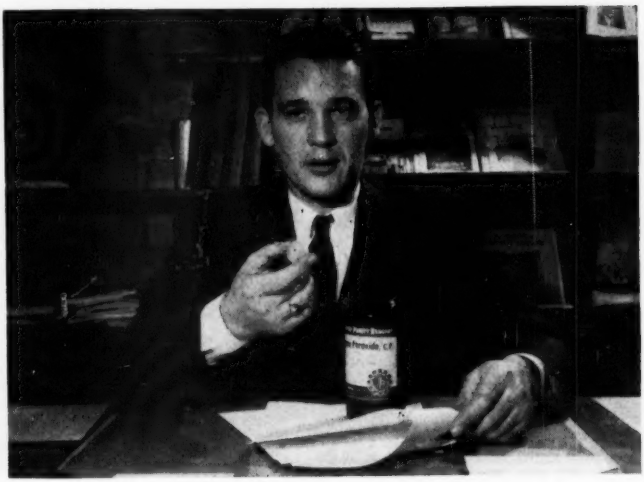


W. TAEBEL: The trick was in the cap.

Peroxide Bottle

This week, the research staff at Eimer and Amend Division (Fisher Scientific) can look proudly at its record — 2½ years of packaging hydrogen peroxide . . . without a single "pop." The remarkable record is due to the ingenious container developed by the staff after 18 months of trial and error.

According to Bill Taebel (Director of Chemical Operations) 30% hydrogen peroxide is the most troublesome chemical the reagent packager must handle. Because of its rapid deterioration (normal shelf half-life is 3 months), it is virtually impossible to ship so consumer will receive it at potency level.

And since deterioration means rapid evolution of oxygen, the solution must be shipped in a vented container that will not allow the liquid to escape if the container is inverted. Added to this is the fact that, since container must be chemically resistant to H_2O_2 throughout its shelf life, a minimum of 6 months must be spent to evaluate the container.

Solution: To keep the compound at potency, Taebel adds a special inhibitor. Composition of the inhibitor is a carefully guarded secret (stability of Eimer and Amend's H_2O_2 solution is reportedly envy of the trade). As further insurance, Taebel relies on the accepted measuring rule for housewives and chemists—one for the "pot." The 30% H_2O_2 is actually prepared and shipped at 31% concentration.

For the container, Taebel and his staff settled on an ordinary glass bottle, with a trick cap. In the cap is a conical hole, the point of the cone on the outside. Inside the cap is a plastic liner (also of secret composition). A slit in the liner serves as the vent.

When the pressure of the gas gets sufficiently high, the slit is forced open into the hole in the cap and the gas escapes. The liner is rigid enough for the slit to remain closed under the pressure of the liquid alone.

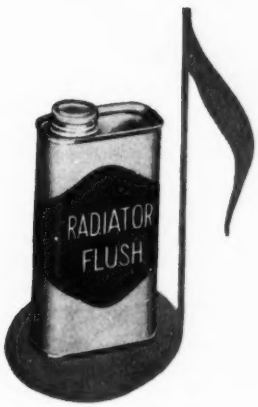
As a safety factor for handlers, the glass bottle is shipped in a metal container packed with glass wool. The glass wool is not only a cushioning agent but absorbs any liquid that might escape through leakage or breakage.

Cost: Hydrogen peroxide is but one example of the problems besetting a reagent packager. For the consumer, it all adds up to increased cost.

Out of every dollar spent for reagent chemicals, an average of 20¢ goes for the cost of packaging. The biggest single cost-contributing item is the container itself. This may account for between 5 to 75¢ of the purchasing dollar and in some cases the figure may approach 90¢.

Other factors that tend to increase cost are: equipment necessary to control humidity while packaging hygroscopic materials; involved technique required to seal a labile substance under an inert atmosphere, and allocation of funds for developing containers and technique.

A Symphony in "F" Style Cans



Continental "F" Style cans strike a high note in packaging chemical products from floor wax to radiator flush.

If specifications call for lithography, Continental's specialists can make brands stand out against competition. And, of course, products are well protected when shipped in Continental "F" Style cans.

These rugged, attractive cans are made in practically every size: ½-pint, pint, quart, ½-gallon and gallon.

Continental also makes steel containers that are tops for bulk shipments of chemical products. They include:

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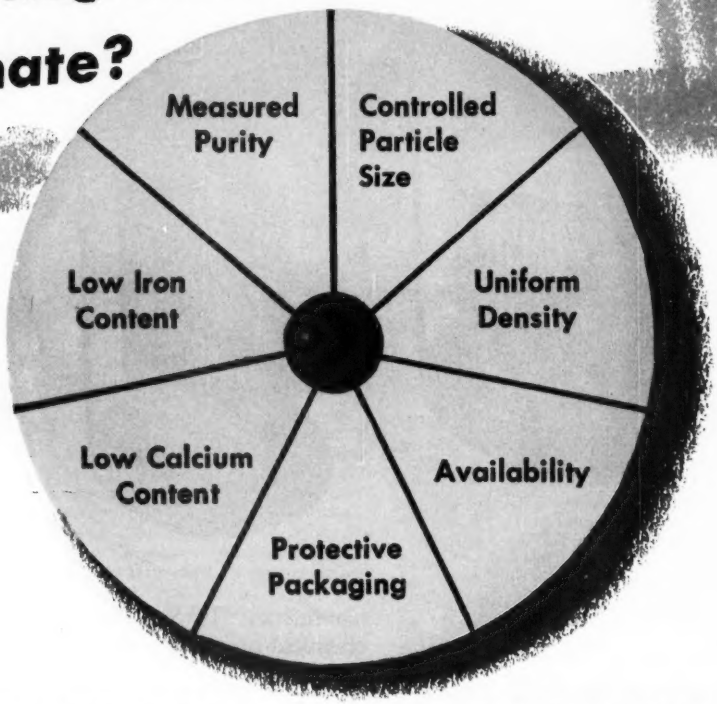

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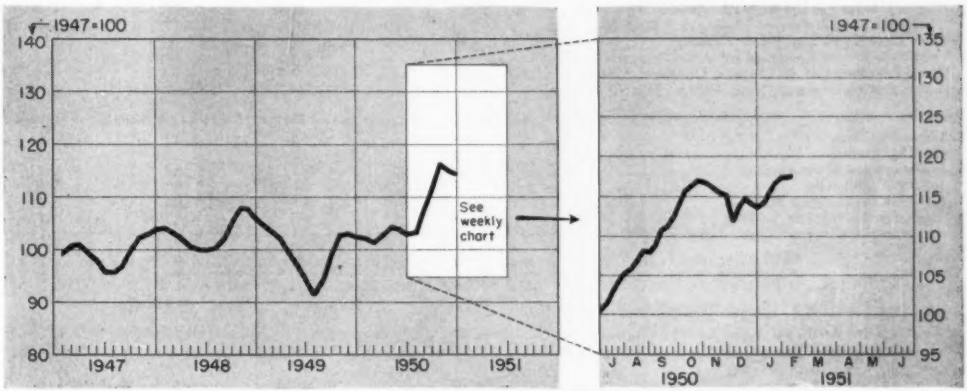


CHEMICAL INDUSTRIES OUTPUT INDEX—Basis: Total Man-Hours Worked in Selected Chemical Industries

Until the economic control brakes take hold, numerous price-wage adjustments will be tossed around between the Office of Price Stabilization and the Wage Stabilization Board. Last week's developments: Wage boost for anthracite miners, price increase in coal, and steel scrap price rollback.

Without visible means of support, the stratospheric mercury price of $200 a flask became untenable. Although quotations at Spanish ports remain unchanged, a definite weakening of U. S. demand has been apparent in the last ten days, registering a $6 decline as consumers registered indifference.

Problems of the small business man in this conversion period receive careful attention. The Senate Small Business Committee, heeding the supply predicament of many styrene plastics fabricators, will shortly re-examine the entire synthetic rubber program slated to take two-thirds of all styrene production in 1951.

Statistics on the decline in chemical production in December, shown by the output chart, are confirmed by U. S. Department of Commerce figures for fats and oils usage. About 48 million lbs. less were refined than the November total of 519 million, but reductions were negligible for other kinds of processing and for inedible products.

A tremendous surge in rubber use set a new record in 1950, the last year for unrestricted civilian demands. New rubber consumption amounted to 1.3 million long tons, an increase of 25% over 1949; use of all types of synthetics came to 532 thousand tons, including 413 thousand tons of GR-S.

Government production of GR-S amounted to 351 thousand tons, with a December rate of 39 thousand tons. Imports of natural rubber including latex reached 905 thousand tons, but the last pound cost three times the 18¢ price of January, 1950.

Effects of the short-lived railway strike will continue to be felt for a long time. Chemical manufacturers in the Midwest were hardest hit, but the new supply bottlenecks will eventually be transmitted to the entire economy.

MARKET LETTER

WEEKLY BUSINESS INDICATORS	Latest Week	Preceding Week	Year Ago
Chemical Industries Output Index (1947=100)	116.5	117.6	102.7
Bituminous Coal Production (Daily Avg. 1000 Tons)	1588.0	1902.0	1090.0
Steel Ingot Operations (% of Capacity)	98.5	96.7	86.5
Wholesale Prices—Chemicals and Allied Products (1926=100)	145.0	144.9	115.6
Stock Price Index of 14 Chemical Companies (Standard and Poor's Corp.)	224.5	219.1	161.9
Chem. Process Industries Const. Awards (Eng. News-Record)	$19,231,000	$22,190,000	$11,874,000

MONTHLY BUSINESS INDICATORS—FOREIGN TRADE EXPORTS		Latest Month	Preceding Month	Year Ago
Chemicals Total	Million Dollars	$66.7	$70.2	$67.0
Coal Tar Products	"	5.9	5.4	5.4
Medicinals and Pharmaceuticals	"	19.2	23.2	18.6
Industrial Chemicals	"	9.0	9.4	9.2
Fertilizer and Fertilizer Materials	"	3.9	4.4	11.0
Vegetable Oils and Fats, Inedible	"	8.5	4.1	3.7

Commitments by several major refiners to make more benzene from petroleum meet government blessing and cheers from the plastics industry. Standard of California's proposed $10 million "Platformer" at El Segundo is slated to make 13 million gallons annually and to go on stream by the summer of 1952; increased capacity by Esso, Atlantic Refining, Shell, and others, will be detailed soon.

Hero of the paint and varnish industry this year will probably turn out to be soybean oil. With tung oil supplies cut off from China, and below-average crops of domestic tung and cottonseed, soybean use has been rising steadily, spurred by abundant harvest and sustained demand.

Long eyed by the government for added revenue, depletion allowances for oil wells now face the prospect of curtailment from the present 27½% to a government proposed figure of 15% annually. As both groups marshaled their arguments and political strength, the chances seemed good for a compromise.

Index of Canadian business activity: exports from our northern good neighbor made substantial progress in setting new records in 1950. Exports to the United States were $3.1 billion, and 65% of the total. Chemical shipments in this category showed a healthy trend to $58.5 million from $33.3 million a year ago.

U.S. manufacturers, contending with rising costs and dwindling supplies, are hopeful about the combined international effort to safeguard critical materials. The current situation has made thriving business for speculators while hobbling defense.

News from Germany of labor participation in management functions evokes the attention of U.S. industrialists. This "co-determination" applies only to the German chemical industry, with the significant agreement by labor not to interfere with cartelization—a move usually designed to extend foreign marketing activities.

SELECTED CHEMICAL MARKET PRICE CHANGES—Week Ending February 12, 1951

UP

	Change	New Price		Change	New Price
Almond Oil, sweet	$ .03	$ .58	Grapefruit Oil	$ .35	$ 1.85
Argols (100% basis) per 100 kilos	3.00	23.00	Lemongrass Oil, native	.50	5.00
Balsam, Copaiba	.25	2.00	Linseed Oil, raw, tankcar	.005	.225
Caprylic Acid (90%) l.c.l.	.02	.49	Methyl Anthranilate	.50	3.00
Cedarleaf Oil	.15	3.00	Oiticica Oil, tankcar	.01	.305
Coconut Oil, crude, W. Coast, tankcar	.01	.215	Peppermint Oil, redistilled	.35	8.35
Copra, W. Coast/ton	15.00	275.00	Spearmint Oil, USP, drums	.35	5.70
Eugenol	.30	3.40	Tin	.01	1.84

DOWN

Carnauba Wax, No. 1 Yellow	.02	1.35	Menthol, USP	.05	14.25
Cocoa Butter	.02	.79	Quicksilver (76 lb. flask)	1.00	216.00

Prices per lb. unless quantity is stated

STOCK EXCHANGE: Scramble is definitely toward safe and sane chemical stocks.

Chemicals: "Bluest Chips"

Safe-playing, long-term investors swing to chemical securities as best bet in years of war and peace.

Wellington Fund, large investment company, more than doubles chemical stock holdings during 1950.

Character and growth of chemical industry more attractive to investors than lush dividends of other fields.

This week the Wellington Fund, one of the largest investment companies in the country, revealed that it had more than doubled its substantial holdings in the chemical industry during 1950. The market value of the Fund's investment in chemical common stocks at the year-end amounted to $6,006,412 as compared with holdings of $1,680,000 of chemical common stock held at the end of the previous year. Eleven chemical companies were represented in the Wellington stock holdings at the close of 1950 whereas stock in only three was held at the end of 1949.

Among the chemical securities now held by the Wellington Fund are those of the Koppers Company, Air Reduction, Allied Chemical and Dye, American Cyanimid, Dow, Hercules Powder, Monsanto, Union Carbide & Carbon, U.S. Potash and Victor Chemical Works.

Actually the Wellington Fund's report of its increased chemical holdings followed by only a week the sale by Dewey and Almy Chemical Company of 12,000 shares of its authorized but previously unissued common stock to an investment firm. The entire proceeds of this sale ($32.50 per share) will be used by D & A in their expansion program.

A trend: It's a good bet that the interest of investment trusts in chemical stocks will continue to grow unabated for some time to come . . . a situation of great importance to the growing chemical industry. For years investment companies have served as bird-dogs for financial people on the hunt for sound investments. In fact, financial firms and large investors eagerly scan each report issued by the big investment trusts (who must play it safe) to learn of any changes in stock holdings as a guide to their own investing policies.

One reason for such respect for the decisions of the trusts is that they only change their portfolio holdings after a thorough and cold-blooded appraisal of all the salient facts. And the appraisers are men selected for their ability to judge stock values.

Facts come to the investment companies quite easily since most companies are eager to have their stocks bought by long range investors such as the investment trusts. In addition investment companies are noted for their quantity buying, a situation that often raises the investment rating of a given security and gives it increased price stability.

Blue-chips: That chemical companies are favorite blue-chips of investment companies can also be seen from the results of a recent survey made by the New York firm, Aigeltinger & Company. It showed that 55 leading investment companies now own 318,000 shares of DuPont common stock, 52 trusts own 425,000 shares of Carbide and Carbon common stock, 35 concerns own 222,000 shares of Dow Common stock and 40 hold 396,000 shares of Celanese stock. Other chemical processing companies such as those engaged in petroleum refining also rate high on the list of favorites. And one investment company, Chemical Fund Inc., confines its investments solely to securities of the chemical processing field.

High PTE: Such popularity of chemical investments must be deserved. This is especially true in light of the high prices that must be paid for the chemical "blue-chips." In the years before World War II, for instance, stocks were generally selling at 10 times current earnings. But the leading chemical stocks were priced on an average of about 20 times current earnings (price-times-earnings ratio). While this PTE has since changed, the relatively high price of chemical stocks as compared with securities of other companies has continued.

During this past year stocks of the leading chemical companies were priced on an average close to 11 times 1950 average earning rates. But this was about double the PTE of the general run of the common stocks listed on the big exchanges. And more important . . . it was well above the estimated 8.6 times-earning ratio of the blue-chip stocks used in compiling the Dow-Jones industrial average.

The popularity of chemical investments is all the more remarkable when it is realized that chemical companies are not noted for lush dividend yields. They are in the established habit of withholding a large chunk of each year's earnings for expansion and improvements. But in spite of this the investment trusts continue to nominate chemical securities as favorite buys.

Steady growth: The reasons they give are many. In first place, however, is the reputation the chemical

industry has earned for steady growth. Year after year and decade after decade, leading chemical companies have shown steady growth, in both good times and bad, and with no serious interruptions.

The internal flexibility that makes this possible is due mainly to the heavy emphasis on research and new-product development that is found in the chemical industry. During the spring of 1949, for instance, there were evidences that the postwar spurt in industrial activity was tapering off.

But chemical companies were ready for this. They swung their attentions to the problem of development and introducing new products or uncovering new uses for established lines. As a result, when industrial activity revived, the increase in the demand for chemicals production was even sharper. Furthermore, the push given to the development of new chemicals (favorable profit margins) largely accounted for the fact that pre-tax profits of leading companies in 1950 showed gains averaging about 50 percent, in comparison with sales gains averaging only 25 percent.

Even war doesn't interrupt the growth pattern of the chemical industry. The industry is in the fortunate position of being able to convert fairly quickly from civilian to military production. And although the World War II Excess Profits Tax hit the chemical companies rather heavily, their good growth characteristics enabled them to continue to make gains even during the war years.

The net result for the investor has been an increase in the value of the chemical securities he has held. An investment of $1,000 in DuPont common stock in 1919 would have grown by now to over $10,000, while a similar investment in Celanese would have soared to 25 times its initial value plus dividend payments averaging nearly 6.5 percent over the years.

Astute trust managements, however, are even more interested in the appraisal of future prospects than in past records in selecting stocks for investment. Whether and how much a past growth record can be expected to continue is the big question they ask.

Optimism is supported in this connection by the fact that research activities have multiplied in scope with the growth of total revenues. This has resulted in a stepped up pace of new product development to a point where some companies are turning out a new carload chemical every few months and where several important new drugs are appearing on the market each year in contrast with the one-major-discovery-in-a-decade pace that obtained only fifteen years ago.

But there are numerous other reasons why investment trusts like the chemical industry as a field of investment. For one, most financial people have developed a great respect for the solidity and the ability of chemical management personnel. These same qualities have also resulted in a high public regard for the industry as a whole which tends to strengthen the position of the investment houses themselves.

The military importance of the industry is another financial asset. And the relatively greater immunity of the chemical industry from political attack is a big help too. The fact that labor cost per dollar of investment is comparatively low keeps labor expense increases from cutting unduly into profit margins during periods of rising revenues. This is an argument that gets greater and greater weight in financial circles every day.

In fact everything points to a prediction that chemical securities will be blue-chips for some time to come.

Atomic Furnace

News that the Atomic Energy Commission is considering the offer of 2 industrial groups (Monsanto and Dow-Detroit Edison) to build nuclear reactors could be a sign of the times. Although AEC promised nothing more than a willingness to discuss the problem with qualified representatives of the groups, its attitude points toward close cooperation with industry in the future. In any event, final word on such policy will be with Congress.

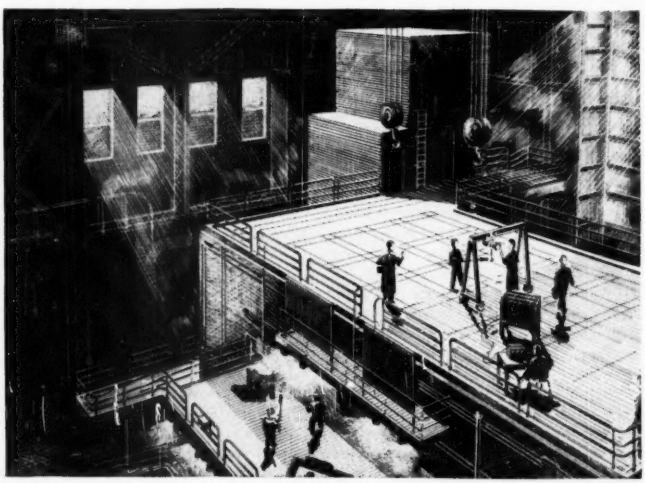
Monsanto has been anxious to get into the reactor picture for some time. Last summer, Charles Thomas, (executive v. p.) urged the Commission to let industry have its fling at harnessing atomic power. Specifically, he suggested that a 75,000 kw. power plant could be built in Idaho for producing phosphorous.

Proposal: Monsanto would foot the bill for building a $25 million nuclear reactor. The government would provide uranium as raw material and would receive all plutonium and other materials (tritium?) produced. The company would experiment with the released atomic energy—attempting to convert it economically into electric power.

The joint offer of Dow and Detroit Edison was substantially the same, AEC says. M. E. Putnam (Dow general manager) said his company was pleased to offer its technical knowledge, research facilities, and resources to AEC for the project. He added that it is an encouraging sign that a government agency is ready to work cooperatively with the American industrial team.

Neither the commission nor industry is ready to commit itself to any action other than studying the feasibility of building the reactors. However, AEC's attitude opens the door to offers from other financially responsible concerns. Its requirements are that they submit well-defined objectives, have an adequate staff for the work, and give the Commission a detailed report of findings. If national security would not be endangered, the report would be made public.

Participation by industry will un-



EXPERIMENTAL NUCLEAR REACTOR: Precursor of industrial power plant?

doubtedly hasten the day of atomic power plants but that day is still 10 or 15 years away. Furthermore, AEC insists that special attention will be paid to work that will bear fruit in 1 to 3 years. The big obstacle to building the plants continues to be prohibitive costs, although rumor persists that an atom-propelled submarine will be launched in the near future.

Oil and Mars

National Petroleum Council has appointed a committee at the request of the Department of the Interior to look over the prospects for increasing oil production in case of war. The Interior Department says that its preliminary studies (as well as past experience) have indicated that in the event of war there would be a sharp increase in the demand for petroleum to meet military and other essential requirements.

The NPC committee, headed by Robert E. Wilson, chairman of the board of Standard Oil Company (Indiana) will investigate the problem along two lines: (1) capital and material requirements for increasing the availability of petroleum products and (2) manpower requirements of the petroleum and gas industries.

To help guide the committee on the first point, H. A. Stewart, Director of the Department of Interior's Oil and Gas Division, told the committee that the magnitude of the quantities is not known and that it is important that the government have authoritative data for defense planning estimates.

Stewart claims that for present purposes it should be assumed that the ultimate expansion of production may amount to a million barrels a day more than the present output. Since current production is running at about 6 million barrels daily, this would entail a 16 percent increase at least. All such expansion should be in the Western hemisphere, he added, and the proportionate production of principal petroleum products should be the same as in 1950.

The manpower study is necessary, claims Stewart, to determine the labor requirements in the industry. Labor shortages might prove to be a limiting factor in times of crisis.

The committee will also make a study of the demand for liquid petroleum gas by states for the months of December 1950 and January 1951. Local spot shortages of LP gas have been reported and menace some industrial operations.

Octane limitations are another concern of the petroleum industry this week. Octane ceilings of 90, 86 and 84 recently proposed by the Petroleum Administration for Defense have a large segment of the petroleum industry up in arms. Ceilings are being proposed to save tetraethyl lead for military aviation gasoline and stockpiling.

Some petroleum refiners want PAD to reduce each refiner's supply on a uniform percentage basis, letting each company handle the problem as best it could. But this, PAD argues, would force some refiners out of the premium gasoline business. Larger refiners, operating modern equipment can produce premium grade gasoline with smaller amounts of lead than are needed by the smaller refiners to produce the same quality of fuel. The future will tell.

•

Munitions Board's semi - annual stockpile report went to Congress last week. The board said that up to the end of last year it bought $2.7 billion worth of strategic materials for the stockpile. The goal was $8.8 billion. Board claims it might have bought more if they had received more of the buying money earlier. Actually they received only $4.4 billion by the end of the year. Last month Congress rushed another $1.8 billion—somewhat late because others had already bought what it was supposed to buy.

•

NPA told shoe manufacturers that production of chemicals used in formulation of plastics and adhesives for the shoe industry, and now in short supply, is expected to increase. The agency advised manufacturers who have difficulty in getting synthetic rubber soles, heels and rubber cement to appeal directly to their suppliers.

Alkali Edict

Present acid tempers among alkali producers are understandable. A recent order signed by Federal Judge Samuel H. Kaufman created a permanent injunction against any restraint of domestic and foreign trade of the U. S. by alkali producers and export associations. In the seven-year-old trial that brought the injunction into being, two American and two British export associations and 12 producers of alkali products were found guilty of conspiring to fix and stabilize the price of caustic soda in the U. S.

The decision made a rather startling interpretation of the provisions of the Webb-Pomerene Act of 1918, which ordinarily grant export associ-

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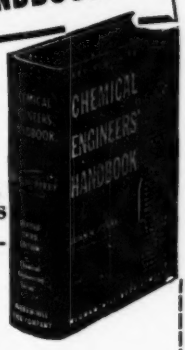

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ations some immunities from anti-trust laws. The court found that the agreements reached by the alkali export associations in this case were not type of agreements that the Webb-Pomerene Law places beyond the reach of the Sherman Anti-trust Act.

Defendants: American associations named as defendants were the U. S. Alkali Export Association (Alkasso) and the California Export Association (Calkex). Foreign associations named were the Imperial Chemical Industries, Ltd. (I.C.I.) of England and I.C.I. of New York. Co-conspirators (according to Kaufman) but not defendants in the case were Solvay et Cie and I. G. Farben.

Two of the firms composing Calkex withdrew in 1948. The remaining member, West End Chemical Company, dissolved the organization by its withdrawal in 1948 although both the association and the firm were named in the order.

The other defendant producers were all members of Alkasso. The firms: Diamond Alkali, Hooker Electrochemical, Mathieson Alkali Works, Wyandotte Chemical (withdrew from Alkasso in 1948), Pennsylvania Salt, Pittsburgh Plate Glass, Southern Alkali Corp., Westvaco Chlorine Products, Church and Dwight, Dow Chemical, and Niagara Alkali.

Alkasso officials are not ready to discuss the impact of the judgment. They say it is too early—the whole judgment must be studied at some length. One important point: there have been no agreements in effect since the war.

However, counsel for defense, is rearguing the case in 1949 said, "the association was going strong in foreign markets . . . and some instruction or expression as to whether we can or cannot have one and under what circumstances . . . is an important thing." Counsel added that he saw, "no reason why we can't have one tomorrow under the law."

A report by the Federal Trade Commission on international cartels in the alkali industry traces the formation of the export associations, the nature of the agreements entered into, and the history of the trial which began in 1944.

Territorial agreements: The cartel reportedly divided the world into territories jointly served or exclusive to particular members. Of prime importance in the case was to determine whether the U.S. was territory exclusive to Alkasso.

The government showed a preliminary draft of an agreement made between I.C.I. and Alkasso stating that I.C.I. would not increase shipments to the U. S. and its dependencies. A second paper (from an I.C.I. of N. Y. official) requested that the phrase be deleted at the instance of Alkasso representatives, " . . . in order to avoid embarrassing questions which might be raised by the Federal Trade Commission should they call for a copy of the agreement."

The president of Alkasso, when confronted with the documentary evidence on the witness stand, admitted the deletions but denied emphatically that it was made for the reason stated. Nevertheless, the court decided on the basis of that and other evidence that the United States became subject to international partitioning among defendants.

"Bootleg" sales: The FTC report states that Alkasso undertook to curb competitive selling by independent alkali exporters and merchants. To minimize such "bootleg" sales, Alkasso offered to handle all surplus offered for export by non-members. Members stipulated in all domestic sales contracts that the material would not be used for export and refused to make sales to consumers or distributors who allowed material to leak into unauthorized channels.

The report adds that the association developed an elaborate system for gathering statistical data on export shipments made outside of Alkasso. Alkasso maintained inspectors at ports to examine export shipments and compiled and circulated blacklists of independent exporters classed as "bootleggers." It had had standing orders with certain parties in the trade to purchase any free tonnage which might enter unauthorized export channels.

Caustic prices: During the time from the formation of Alkasso to the signing of the first agreement, domestic prices of the three alkalies (soda ash, sodium bicarbonate, and caustic soda) fluctuated substantially. After the understanding was reached with I.C.I. prices stabilized and remained so during periods of prosperity and depression.

In its findings, the court said, " . . . the domestic price stability of caustic soda was in marked contrast to what the defendants showed were frequent and sharp fluctuations in the average export return, a contrast more significant when it is considered that the unwavering prices on the domestic market failed to reflect the depression of 1937 while export prices showed sharp responses to the vagaries of the economic cycle."

NPA On Rubber

NPA recently revised its M-2 order on synthetic and natural rubber. It reduced (slightly) the amount available for civilian uses, and ordered an increase in camelback for recapping auto tires. To get more rubber into the country from Latin America, NPA also exempted the lower grades from exclusive government importation permits. But these were softening up operations.

The big blow will come this week and early in March. NPA has told industry exactly what it intends to do. The first step will be to issue an order prohibiting use of new rubber in manufacture of different styles, colors, types, or quality of a product for any one purpose. This simplification will begin this week for some segments of industry. Manufacturers who cannot convert by that date will be given additional time.

By March 1 (or as soon after as practicable), the use of natural rubber will be eliminated from such nonessential products as toys, non-functional rubber goods (i.e. where rubber is not essential to operation of equipment), rubber sundries not essential to basic health needs, floor coverings, mats and matting, new or replacement shoe soles, heels, and inner tubes of diameter less than 8.25". The last item means all passenger tubes will be synthetic.

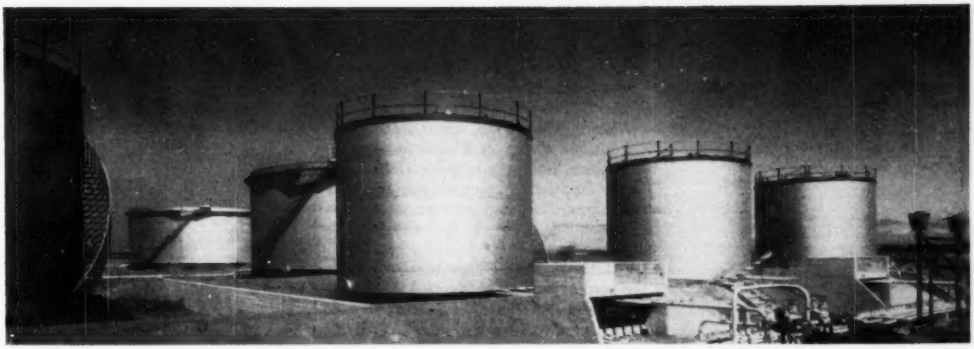
The last M-2 revision permits civilian consumption in February at 72% of base period (year ending June 30, 1950). Consumption had been allowed at 80% of base. Natural rubber use for February remains at 43%. In March, NPA will permit total new rubber consumption at 76%, and natural rubber will be cut to 35%.

In the revision NPA also ordered rubber makers who produce camelback to increase production 50% in February and March. Those making only camelback will continue at 100%.

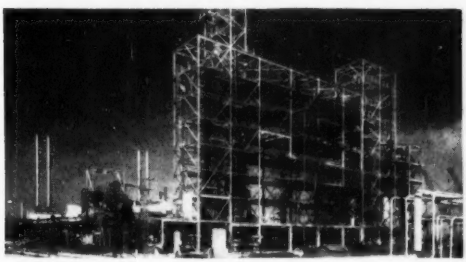
NPA attaches great importance to camelback. This recapping material contains about 5% natural rubber, the rest synthetic or reclaimed. To recap a 6.00 x 16 tire, 5 lbs. of camelback are required. A new tire requires 11 lbs. of new rubber, 35% of which is natural rubber.

•

ESA's Office of Price Stabilization revealed last week that one of its commodity pricing divisions will be a "Rubber, Chemicals and Drugs Division." The rubber branch of this division will have a tire section and a rubber products section.



1 OIL STORAGE TANKS at Wilton Works will receive petroleum from ocean going tankers berthed in the River Tees.



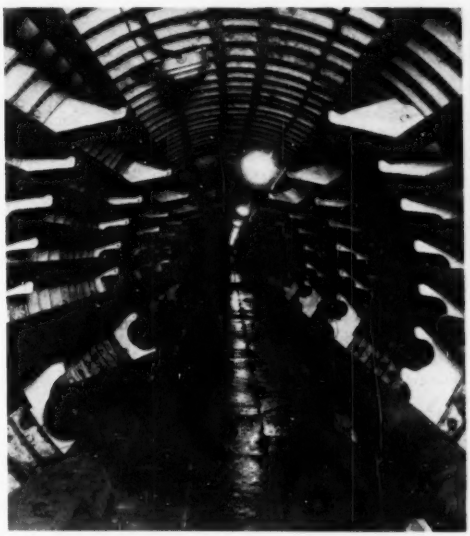
2 FRACTIONATION PLANT will separate ethylene and propylene from the gases produced by petroleum cracking.

FOREIGN . . . . . .

I.C.I. Unlimited

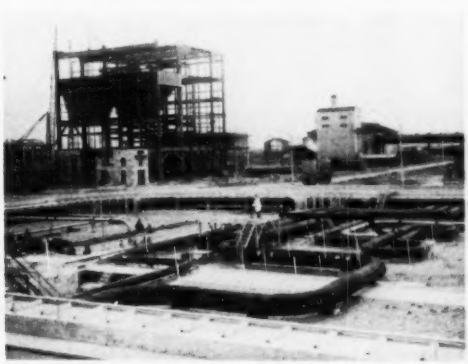
At an estimated cost of £22 million, Imperial Chemical Industries Ltd., huge British combine, is developing a site at Wilton, North Yorkshire, that will accommodate a large portion of the company's expansion for some time. Space is available for any of I.C.I.'s 11 divisions that may require expanded production facilities.

Currently construction is being pushed on the construction of petrochemical installations to bolster Britain's position with respect to solvents, synthetic detergents and plastic materials.



3 LINK TUNNEL (1,750' long) carries pipelines for propylene and other gases under River Tees to I.C.I. plant on other side.

4 PICADILLY CIRCUS is name given to busy intersection of pipelines carrying hydrocarbon gases to production areas.



5 MAIN BOILER HOUSE when completed will require 500 tons of coal daily to furnish process steam and power.

PEOPLE . . . . . .

Stanley de J. Osborne, formerly vice president and treasurer for Mathieson Chemical Corporation is now financial vice president. He will supervise treasury and administrative departments for company. Willard G. Rouse will take over duties of treasurer.

•

Wanton E. Gladding is now manager of Du Pont's Fiber V plant to be built at Kinston, N.C. Gladding started with the company in 1925 as an operator of the Buffalo plant. Before promotion, he was personnel manager for Nylon Division.

Clarence Lynn is new engineering manager of the Atomic Power Division of Westinghouse.

•

Leslie Cleminson, head of British Columbia Paper & Pulp's project at Sturgeon Falls, Ont. since 1946, has been appointed general manager of company. His headquarters will be in Vancouver.

•

Harry E. Hartzell has been appointed supervisor of production facilities for Hercules Powder British operations, and will assume duties April 1. Until that time, he plans a 5 week trip to England to familiarize himself with the work there.

•

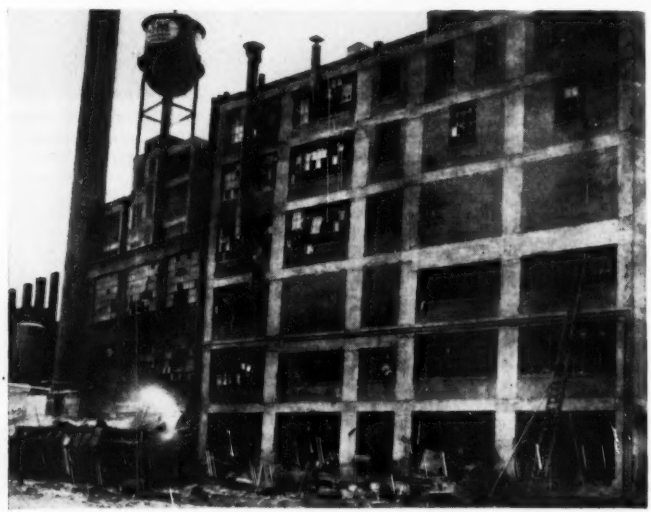
Norman Walker will be sales manager of Pittsburg plant of Fisher Scientific. Walker is a member of the ACS, Pittsburgh Section, and the West Virginia Academy of Science.

•

U.S. Rubber: Big ordinance plant at Kankakee, Ill. will be reactivated and will be in production in about 4 months. U. S. Rubber, which operated the plant during the latter years of World War II, will reactivate and operate plant.

Plant was built in 1941 at a cost of $80 million and was originally operated by Du Pont. During war, the plant turned out approximately 1.4 billion pounds of explosives.

Butane Line Explosion Hits 3M



EXPLOSION at St. Paul plant resulted in at least 11 deaths and 50 injuries. Company officials and St. Paul Fire Department theorize that one or more of butane fired furnaces in basement exploded.

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BOOKS . . . . . .

The Chemistry of the Nonbenzenoid Hydrocarbons by Benjamin T. Brooks. Reinhold Publishing Corp., New York, N. Y.; xiv + 615 pp., $12.00.

Revised to keep pace with the advances made in the field of petroleum chemistry since 1922, this second edition presents an intensive survey of paraffins, olefins, and cyclic (other than aromatic) hydrocarbons. The author, a leading authority on the subject, thoroughly discusses the chemistry, properties, methods of synthesis, thermal cracking, oxidation reactions, polymerization, alkylation and theoretical aspects of the numerous classes of hydrocarbons having a non-benzenoid structure.

Throughout the book the author retains an original purpose of his first edition of bringing out by illustrative examples the close relationships of non-benzenoid hydrocarbon chemistry. Special emphasis is given to the developments resulting from the study of cracking processes and, soon after, from the chemical utilization of olefins produced by cracking. The study of the antiknock values of individual hydrocarbons and the recently discovered processes of alkylation are also reviewed. This scientific treatise is an important one for all organic chemists and particularly petroleum chemists, chemical engineers, and those engaged in producing synthetic rubber and other high molecular weight polymers from petroleum and hydrocarbon gases.

Monoply and Free Enterprise, by George W. Stocking and Myron W. Watkins. The Twentieth Century Fund, New York, N. Y.; xiii+596 pp., $4.00.

This volume is the third in a series of reports growing out of a major Fund Survey in the field of monopoly —both international and domestic. While the study discusses the problem of industrial government in a democratic society in general, it focuses primarily on the relation of business organization to the structure and behavior of markets.

The report finds that in a number of fields there has been a tendency to concentrate business activity in the hands of a few large firms but points out that the need is not for an arbitrary assault upon size as such, but rather a vigorous effort to discover those market situations where concentration of control is prejudicial to the public interest. In view of the economic principle that enterprise can be free only when it is competitive, it shows by specific instances how the free play of competitive forces has been limited by American business concerns, and in certain fields, by legislation. Furthermore, the authors examine the attempts of government at controlling monopolistic practices. A final chapter contains the report and recommendations for action of the Fund's Committee on Cartels and Monopoly.

Data Book on Hydrocarbons, by J. B. Maxwell. D. Van Nostrand Co., Inc., New York, N. Y.; 259 pp., $5.00.

Intended for practicing engineers and students of petroleum technology, this book provides basic data on hydrocarbons and petroleum fractions and the methods of applying these data to process engineering. The author discusses the applications of a few of the unit operations of chemical engineering such as those involved in the flow of liquids, flow of heat, equilibrium flash vaporization and fractionating towers; these are used extensively in the petroleum industry. Multiple illustrative examples and some fundamental theory accompany the data presented in this book.

Modern Chemical Specialties, by Milton A. Lesser. MacNair-Dorland Co., New York, N. Y.; 514 pp., $7.25.

On an essentially practical basis, this text discusses the formulation, manufacture and use of many polishes, cleansers, detergents and allied chemical specialties. Comprising 42 chapters, each deals with a different specialty, including formulas and manufacturing methods for that specialty. This book is no manufacturing manual but is designed rather to bring men in the industry information on the most recent developments in each field. It is also intended to familiarize new people in each field of products with the character and type of current developments. Other topics covered include textile products, floor soaps and waxes, leather care products, and industrial and household specialties.

Heterocyclic Compounds, Vol. II, edited by Robert C. Elderfield. John Wiley & Sons, Inc., New York, N. Y.; vii+571 pp., $15.00.

In this volume of the series dealing with the heterocyclic compounds, the chemistry of the polycyclic compounds containing one oxygen or sulfur atom is covered in considerable detail. As in the first volume, primary emphasis is on presenting the chemical principles of the substances treated rather than on giving an exhaustive compilation of physical constants. The authors explain and correlate observed facts in the light of modern organic chemistry and its newer concepts but avoid mere theoretical speculation. Since the chemistry of such substances as benzofurans, coumarins, chromans, and their relatives is so closely related, breakdown of topics into individual chapters is an arbitrary matter. In order to facilitate location of material, therefore, numerous cross references and a comprehensive index are provided. In addition to this, information on the isolation and chemistry of the large number of natural products within the scope of the present volume has been compiled into summarizing tables with adequate references.

Elements of Fractional Distillation, by Clark Shove Robinson and Edwin Richard Gilliland. McGraw-Hill Book Co., New York; ix+492 pp., $7.00.

In the fourth edition of this standard advanced text, as in previous editions, the authors give the basic principles and design procedures for fractional distillation. This text emphasizes the quantitative aspect of the distillation field in correspondence with the current trend in design methods. Greater stress has been put on the measurement, prediction, and use of vapor-liquid equilibria. Containing additional design examples and correlations, this book is designed to present a unified treatment of the subject for the student chemical engineer.

The Analytical Balance, by William Marshall MacNevin. Handbook Publishers, Inc., New York, N. Y.; xiii + 60 pp., $1.50.

Giving practical information on the care and use of the modern analytical balance, this monograph will be of value to directors of laboratories, research workers, industrial chemists, college instructors, and graduate students. The book covers the problems of selecting, mounting, cleaning, adjusting, testing and repairing a balance in addition to providing a section on "How to Use the Balance." For the more advanced scientific worker, there appears a section on testing the balance for performance characteristics. Theory of the balance is omitted, but reference is made to available material on this subject.

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BOOKLETS

Chemicals

Synthetic Detergents

Technical bulletin describing the use of "Ultrawets" in dry mixing and bringing out the point that the bulk density of the finished product varies according to the form of the synthetic detergent involved as well as to the type of mixing equipment used. The Atlantic Refining Co.

Hot-Spray Lacquer

12-p. bulletin containing summary of survey on the use of hot-spray lacquer and the reasons for its increased consumption by manufacturers for applying protective coatings. Hercules Powder Co.

Alkyd Molding Compounds

Five bulletins on the subject intended as the first sections of a handbook on alkyd molding compounds now being prepared by the firm, covering these topics respectively: the molding of alkyd compounds of the granular type, the properties of these granular alkyds, alkyd compounds of the putty-type, properties of the putty-type alkyd, and finally the properties and uses of molded alkyd compounds. Plaskon Division of Libbey-Owens-Ford Glass Co.

Peroxygen Compounds

16-p. data sheet on the modification of starches, proteins, and gums with peroxygen compounds, illustrating the principle of depolymerization of these high molecular substances by means of hydrogen peroxide. Practical examples, suggestions, and a selection of literature references are supplied. The Buffalo Electro-Chemical Co., Inc.

Acrylic Molding Powders

Booklet on "Plexiglas," injection molding powders furnishing reference data for the man who has to design, molded acrylic parts, and for the men who mold them. Rohm & Haas Co.

Vinyl Stabilizers

10-p. technical bulletin entitled. "Evaluation of Stabilizers for Vinyl Stocks Containing Chlorowax 40" reports the results of a laboratory study of two standard stabilizer formulations, giving the light and heat stability characteristics of each. Also included is a comprehensive table providing data on 22 different stabilizers produced under various trade names. Diamond Alkali Co.

Insecticide Toxicant

4-p. folder describing Thanite, a terpene chemical giving quick knockdown as used in space and residual sprays. Hercules Powder Co.

Tolane

Bulletin describing the uses, properties and prices of crystalline Tolane, a compound which has found wide application

READER SERVICE . . . .

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MAKES IT HANDY

Products and literature in this issue are listed on these pages. There are three indexes. (1) Editorial items on new products, new equipment, new literature; (2) products advertised. (3) The index of advertisers is on the following page.

THE NUMBERS

Advertisements:—There is a page number on the coupon for each advertisement. Before the number, may appear, L, R, T, B (left, right, top, bottom), locating the ad on the page; small letters following (a, b, c) indicate additional products in the advertisement.

Editorial Items:—Numerals are page numbers; the ABC's distinguish among items where more than one is on a page. There is a number on the coupon for each item referring to new products, equipment, and literature.

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BOOKLETS

in the field of nuclear physics as crystals for scintillation counters, and also in organic synthesis. Jasonols Chemical Corp.

Fine Chemicals

January 1951 catalog listing firm's line of fine chemicals, substrates, and biochemicals. Sigma Chemical Co.

Sucrose Octa Acetate

4-p. bulletin presenting detailed report on the physical and chemical properties, specifications, and applications of sucrose octa acetate. Niacet Chemicals Division.

Pigments

Catalog giving data on colored and white pigments and dyes considered to be of greatest use in the formulation and manufacture of paints, lacquers, enamels, and related products. American Cyanamid Co., Calco Chemical Div.

Equipment

Thermocouple and Pyrometer Accessories

56-p. new edition of bulletin on thermocouple and pyrometer accessories containing data on the proper application and use of thermocouples and an illustrated catalog of pyrometer supply items. Included are engineering data on modern practices in pyrometry and tables of calibration data for the commonly-used base metal and rare metal thermocouples. The Bristol Co.

Dryers

12-p. bulletin outlining the design, construction, and erection of custom-built dryers for various product applications in industry and agriculture. Standard Steel Corp.

Feed Water Control

16-p. bulletin discussing advantages, component parts, and operating features of firm's three element air operated feed water control and the problems involved in feed water control. Bailey Meter Co.

Dust Control Technology

50-p. booklet on the subject of "Industrial Dust Control Through Exhaust Systems" including sections on exhaust hoods and piping systems, dust collecting equipment, exhausters and drives, and maintenance of dust control systems. Pangborn Corp.

Stainless Steel

4-p. folder describing paper-thin stainless steel, .010 to .001" thick, for light, vital parts and containing information on how the metal is used and supplied, its manufacturing advantages, and mechanical properties. Armco Steel Corp.

Gaskets

48-p. general catalog, divided into two sections, the first covering spiral wound gaskets and a complete line of metal, metal-asbestos and cut gaskets. The second section deals with Teflon, its properties and uses, and gives detailed information on the various Teflon "Chemiseal" gaskets, packings, adaptors and expansion joints. United States Gasket Co.

Ammeters

8-p. bulletin giving information on the selection, construction, and uses of the "Tong Test" ammeters, an AC and DC current measuring device. Columbia Electric Manufacturing Co.

Electrolytic Cleaning

10-p. revised edition containing information on the fundamentals of electrolytic cleaning, the phenomena that takes place during the process, the differences between the various cleaning processes, and the factors to be considered in selecting an electrocleaner. DuBois Co.

Emulsifier

Technical bulletin on automatic emulsifier for liquid rosin size giving general engineering data, details on how the unit operates, and flow diagrams. American Cyanamid Co.

Chemical Feed Systems

12-p. booklet outlining the operating principles and limiting factors of both the dry feed and solution feed systems with illustrations and diagrams of the various types of feeders. Proportioneers, Inc.

Welded Pressure Vessels

16-p. booklet describing tank equipment and related pressure vessels especially designed for the handling and storing of liquified gases that are inflammable, noxious or pressure-explosive. Pictured are production processes, welding techniques, and equipment. American Car and Foundry Co.

Impregnating Equipment

Folder describing impregnating equipment for use in sealing, bonding or disinfecting processes with any material that can be made to flow or has the proper characteristics of surface tension. Lammert & Mann Co.

Welding Alloys

6-p. folder containing reference charts giving specifications of almost 100 low temperature welding alloys used in welding, brazing, and hard surfacing of steel, alloy steels, stainless, cast iron, brass, bronze, copper, aluminum, magnesium, etc. Eutectic Welding Alloys Corp.

Refrigeration Units

4-p. illustrated bulletin describing the application and construction features of new models of self-contained refrigeration units for testing, storage and processing. Bowser Inc.

Valves

4-p. bulletin reviewing line of valves for actuating air or hydraulic cylinders. Included are circuit diagrams and operation detail, dimensions and weights, and description of the 14 models available. Ledeen Manufacturing Co.

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FOR SPORTSMEN ONLY···

Which of these game birds can you identify?

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2 Philohela Minor _____

3 Meleagris Gallapavo _____

4 Tympanuchus Cupido _____

See next column for answers.

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